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COMMERCE OF DETROIT RIVER.

Maj. W. H. Bixby, United States engineer at Detroit, has issued a statement of the commercial statistics of the Detroit river and St. Clair flats canal, which for purposes of discussion is reprinted precisely as sent out as follows:

"The records of this office, by compilation from reports of the Detroit marine postoffice and the American and Canadian customs offices, show the following results as regards the commerce of the Detroit river and the St. Clair flats canal during the calendar year 1902:

DETROIT RIVER.

Net registered tonnage of all vessels passing Detroit, as well as those stopping at Amherstburg, Windsor and Detroit	39,328,689
Freight carried by such vessels in tons of 2,000 lbs. each	44,260,506
Number of vessel passages (approximately)	33,000
Date of first passage	Apr. 2, 1902
Date of last passage	Dec. 22, 1902

ST. CLAIR FLATS CANAL.

Net registered tonnage of vessels passing through St. Clair Flats canal	37,119,245
Freight carried by such vessels in tons of 2,000 lbs. each	41,773,998"

One of the river and harbor acts of recent years contains a provision, still in force, requiring the engineers to report upon the commerce of all channels and harbors where improvements are made at the expense of the government. This law is not very religiously observed by engineers on the lakes, though from time to time they have endeavored to observe it. True, the customs regulations of the lakes are a hindrance to the collection of statistics, but it must be said that where the engineers have taken the matter up on their own account they have not been especially successful, and even this latest effort of Maj. Bixby, commendable as it is, will not bear analysis. The curious thing about Maj. Bixby's report is the number of vessel passages, which is placed at 33,000 approximately. Why he should approximate this item, which is one that might be definitely ascertained, is a mystery. It puts his entire report under suspicion, because if the vessel passages are only approximated the tons of freight carried and the tonnage of the vessels must also be merely approximate estimates. It is to be feared, indeed, that this is so. Aside from the reports of iron ore shipments, secured direct from mines and railways, there is another special measure of lake commerce that is absolute—a standard by which the whole may be gauged. We refer to the commerce passing to and from Lake Superior through the canals at Sault Ste. Marie. The Sault Ste. Marie report shows that 35,961,146 net tons passed through the canals during the season of 1902. Let it be borne in mind that this is simply the measure of the commerce of one lake. Maj. Bixby gives 44,260,506 net tons as the commerce passing Detroit, which is only 8,299,360 tons in excess of Lake Superior commerce. Is it possible that there is only this slight difference between them? Last year there was shipped from Escanaba alone 5,413,704 tons of ore (gross tons), all of it with the exception of probably 500,000 tons coming to Lake Erie ports. The balance went to South Chicago. Grain and flour shipments from Lake Michigan ports in 1901 aggregated 148,467,425 bushels which is equivalent to about 3,400,000 tons. Lake Michigan grain shipments in 1902 were not much if any less than in 1901. The coal shipments to Lake Michigan ports last year were certainly full 3,500,000 tons. Here we have a total in the three items of ore, grain and coal of 11,813,704 tons, as against the 8,299,360 tons of Maj. Bixby's report. None of this commerce passed into Lake Superior. It is true that some of the ore from Lake Superior goes to Chicago and that there is a trade in package freight to Lake Superior from Lake Michigan ports, but as against that it will be noted that in the foregoing analysis no account has been taken of the considerable lumber commerce originating on Georgian bay and on Lakes Huron and Michigan and passing down by Detroit; or of the coal shipments to Lake Huron ports and to points on the rivers above Detroit; or of the package freight to and from Lake Michigan and Lake Huron ports. Nor has any mention been made of the commerce carried on by the passenger lines operating between Toledo and Detroit, Cleveland and Detroit and Buffalo and Detroit, all of which may properly be ascribed to the Detroit river. Surely to place an estimate of 3,500,000 tons upon the miscellaneous commerce just referred to is a modest one. It is a very great shame there is no absolute port to port measure of commerce on the great lakes. The information is of undoubted value and should be secured. Suppose there were no measure at Sault Ste. Marie. Why the nation itself

would have no adequate comprehension of its growth. As long as the engineers have authority to collect these statistics they should do the work thoroughly or not at all. Certainly they should not give out estimates or approximate figures. Their reports will be quoted because of their thorough methods in other respects. In this case, for instance, we think Maj. Bixby's estimate of Detroit river commerce is very much below the right mark but it will be taken as official, just the same, on account of the source from which it comes.

PLEAS FOR A GREATER NAVY.

Eloquent pleas for a strong navy for the United States were made last week by Gen. Benjamin F. Tracy, secretary of the navy during the administration of President Harrison, and by Mr. William McAdoo, assistant secretary of the navy during Cleveland's administration. They were the principle speakers at a meeting held in the rooms of the Maritime Exchange under the auspices of Maritime Association of the Port of New York. The purpose of the meeting was to interest the public in the movement, now well under way, for the strengthening of the Navy League of the United States.

President C. B. Parsons of the Maritime Exchange, presided and introduced Gen. Tracy. After telling of the educational work done by similar popular bodies in Great Britain, France and Germany, Gen. Tracy said: "More and more the American people are coming to realize that a strong and efficient navy is the best guarantee of peace. Recent happenings have demonstrated that anew. Do you think that during the late events in Venezuela if America had not had her navy in its present state of effectiveness and preparedness our opinions and our requests would have been received so respectfully as they were? In San Domingo, with its two harbors, among the best in the West Indies, a strong navy is vital to our protection and to the protection of the proposed Isthmian canal. Without the safeguards of such an adequate armed force as we now have those harbors would be seized for debts owed by San Domingo, and would be held indefinitely. If we are to maintain the Monroe doctrine a strong navy is requisite to our national life."

Gen. Tracy outlined a plan, which he believed to be practicable, for the manning of a large navy without incurring the expense of keeping the entire force in commission perpetually. He proposed a new form of naval reserve, to be recruited largely from the ranks of able-bodied men whose regular occupations compel them to be idle during a portion of each year. Sailors on the great lakes, coast fishermen and farm hands, all of whom have four or five months of idle season, he said, could be enlisted for a term of years for service during four months of each year. During that period they could be trained and disciplined into an effective body of from 30,000 to 50,000 men. During the remaining months certain of the ships in time of peace could be laid up out of commission. "It is a true saying that commerce follows the flag," said Gen. Tracy, "and if you would build up your commerce on the sea you must build up a navy competent to protect it."

Mr. McAdoo said that many so-called anti-expansionists and anti-imperialists contend that the necessity for a greater navy did not arise until it was born of the evils that grew out of the conquests of the Spanish war. "This," said Mr. McAdoo, "is a fallacy. In my opinion, if we were to withdraw our flag from the Philippines tomorrow and from every other foot of territory acquired through the Spanish war, we should still need as great a navy as we actually need today. Why? Because the American people, without regard to political considerations or limitations, are committed to the doctrine that no other nation of the earth shall dominate in this hemisphere; because, as Secretary Olney has said, we are resolved that in this hemisphere our word shall be law. In the event of anything like disarmament of American sea power the republics of Central and South America would be all a-flutter with the flags of the militant powers of Europe within a month and no diplomacy on earth could prevent it."

Many names were added to the membership roll of the new section of the league, which now includes a large proportion of the officers and leading members of the maritime association. Membership costs \$1 a year, the educational literature which is to be issued to be paid for out of the funds so created. It is expected also that a monthly journal will be published to disseminate the league's doctrines.

The builders' trial of the torpedo boat destroyer Macdonough, which took place recently outside Boston light, was so successful that the Fore River Ship & Engine Co. has asked the navy department to set the date for the official trial. The vessel is 246 ft. long, 22 ft. 3 in. beam and 14 ft. deep, with a displacement of about 400 tons. Her contract speed of 26 knots was exceeded.

FIRST WIRELESS TELEGRAPH NEWSPAPER.

Once upon a time, as the story books would say, there was a place where man could escape from the madding crowd.

That place was the middle of the ocean where he was free from the sinuous undulations of the tape, the metallic tick of the telegraph instrument and the shriek of the purveyors of the penny dreadful. Around and about him was nothing save ocean's gray, melancholy waste. As far as the eye could reach, and further a thousand times, there was nothing to challenge his loneliness. Here and here only did he know the charm of solitude, that charm which comes from unbroken communion with nature. The middle of the ocean is today as it ever was, a troubled expanse of water; but its silence is no longer unbroken. The penny dreadful has invaded it. Truly, it comes in very seemly guise, but it is a chip of the old block nevertheless. Mid-ocean is no longer aloof from the center of news. The messages of the world's doing, more frequently wrong doing, are resolved from the wandering air and caught upon the point of a needle. What a wonderful thing it is that the vibrations of the atmosphere may be seized upon and made to break a silence which has lasted since the world began; what a wonderful thing it is that this intelligence, flashing across the ocean, will dart with lightning speed to instruments that are attuned to it and will pass silently by those that are unsympathetic! The broker can no longer escape his quotations; the promoter the empty promises of his glittering prospectus and the wrath of his deluded stockholders; nor shall milady be deprived of the latest morsel of scandal; nor the prize fighter of his loquacity. Over the air they come to the middle of the ocean, these scraps and bits and tittles of news, these doings of sorry mortals to harass and trouble, to amuse and delight those that flee upon the sea.

The preservation of history is a duty that every man owes to his time. History is daily made by men and women, but unless it be immediately set down it is likely to be forgotten or, at the least, incorrectly reported. Dr. Johnson says that we should struggle for the truth as we strive for salvation; we should fight error as we fight the devil, for error has a certain alacrity for creeping in. "Down with hypocrisy and cant and lies," shouts this sturdy old philosopher, whose character was so great that it will survive when the memory of his intellectual quali-

ties shall have perished.

And so it is for the preservation of a bit of history that the Review prints this week a fac-simile of the first wireless telegraphic news-

paper that was ever published. It is reproduced in its actual size. It is fitting that the premier Atlantic steamship line, the Cunard Steamship Co., should have installed this newspaper ahead of all other lines and should have the distinction of having printed the first ocean newspaper. The steamer selected for the honor was the old reliable Etruria, which has over a long series of years passed like a shuttlecock from port to port with the regularity of a railway train. Regardless of wind or weather this splendid vessel has never varied more than a few hours in her schedule of mail delivery, a truly remarkable achievement. The paper was later named the Cunard Bulletin and a photographic reproduction is given herewith of its present form. It consists of



Title Page of Cunard Bulletin.

four pages. The title page, which is the page reproduced, contains only the exchange of civilities between the Umbria and Etruria. The second page contains the Marconigrams, as the wireless telegraph messages are called. It is worthy of note as a sidelight upon national temperament that two out of six items are upon sporting topics. As a matter of record it might be stated that the Marconigrams were as follows:

"King Edward had great and warm reception in France, and at Rome, where he met Pope.

"Lord Yarmouth married Miss Thaw of Pittsburg and has sailed for England.

"Mountain exploded near town of Franti, killing one hundred and twelve people.

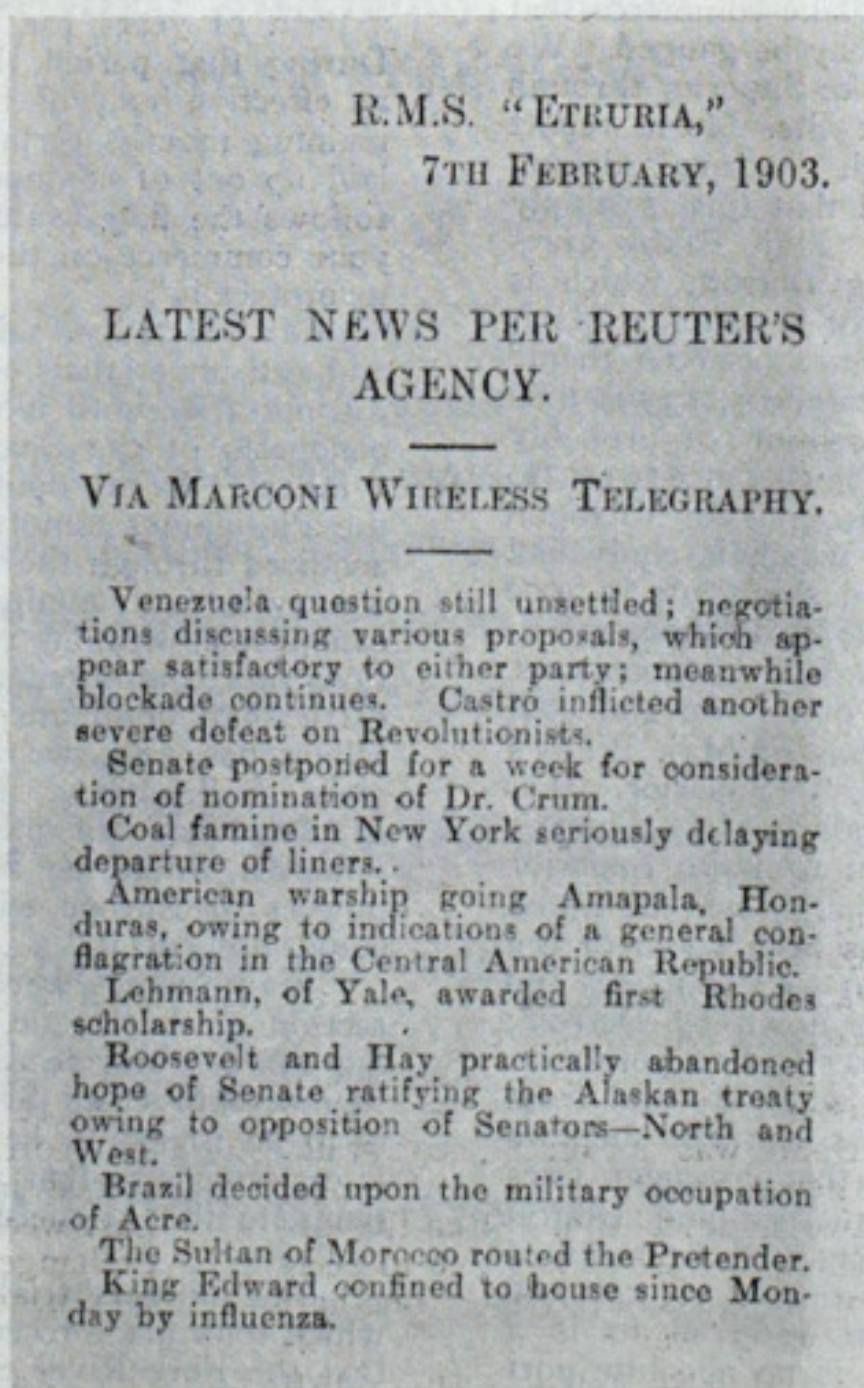
"One thousand guineas stakes run at Newmarket yesterday. Twelve starters. Lord Falmouth's Quintessence, odds four to one, finished first.

"President Roosevelt reaches St. Louis on his tour, also ex-President Cleveland. Both met with hearty welcome and much enthusiasm.

"Reliance not yet been tried for speed, but experts think well of her."

The third page is very cute indeed. It is headed "Local Intelligence." The local intelligence is the log and the day's run and the number of persons aboard, classified as to first, second and third class and crew.

The fourth page contains a picture of the Umbria and the sailing schedule of the fleet.



Fac-Simile of First Wireless Telegraph Newspaper.

HEAD OF THE LAKES NEWS NOTES

Duluth, Minn., May 13.—The Wisconsin law for vessel taxation has been repealed. As is well known there is a Minnesota law permitting of the enrollment of ships on a tonnage basis that gives them a low rate of taxation. Two years ago the city of Superior secured the passage of a similar law for Wisconsin, hoping to secure the enrollment of ships there also. The ships did not hurry to Wisconsin for enrollment and now the state has wiped the act off its statute books. Superior has been trying very hard to secure the passage of a measure establishing Wisconsin inspection for grain, in order that the Duluth board of trade and Minnesota inspection shall not govern grain shipped through the state. So far they have been unable to get this law through and have definitely lost on the original proposition. Now, however, an attempt is being made to pass a law permitting public elevators, under state control, to mix grain and carry on what is usually termed a "hospital" business, something that is allowed in no other state.

Local estimates are that the head of the lakes will receive this year about 4,000,000 tons of coal, including bituminous and anthracite. Of this the various roads are expected to move during the season of navigation from 2,500,000 to 3,000,000 tons. Shipments are now very heavy and the interior is gradually getting back to a normal position as regards coal stocks. The receipts here for the month of April were the heaviest ever known.

The large saw mill of E. Schofield & Co. on the lower bay at Superior burned Sunday. It will probably not be rebuilt. This will leave but one mill at Superior, and that a small one. The Schofield mill had 50,000,000 ft. of logs in boom ready for this summer sawing, all of which can probably be sawn during the year by various Duluth mills in addition to their present cuts if they all run day and night.

Considerable wheat was sold for export and eastern shipment here last week, amounting to about 750,000 bu. on Saturday alone. This is being covered by charters at 1½ cents a bushel. Receipts of grain are small now, and there are in store at the head of the lakes only about 7,500,000 bu. of all classes.

Notwithstanding the negotiations with the Steel Corporation for the transfer of its ore properties to that organization, the Great Northern road has not ceased its endeavors to find ore bodies on the Mesabi range. The road is still looking for traffic with which to increase the enormous annual tonnage it will be assured of under the terms of the Steel Corporation deal if the latter is carried out. The Great Northern is now working on several tracts it has recently taken under option, with a view to finding ore on some, and on others with the idea of proving the representations of those who are trying to make a sale. In every case under the latter heading the road is finding more ore than was measured up by original explorers. But this is the common experience and is only natural.

Measurements of the Duluth Dredge & Dock Co.'s new Columbia show her to be practically a duplicate of the dredge Napoleon. Her gross tonnage is 522 and the net 392. The hull is 124½ x 40 x 8.7 ft. This dredge will have a dipper of 7 yds. capacity and an engine capable of handling it at the rate of 120 turns an hour.

Captains Brooks, Smith and Ryan of Duluth, who started a rather unfortunate cruise for wreckage some weeks ago, have succeeded in recovering about 150 tons of scrap iron and copper from the wreck of the Canadian Pacific mail steamer Alberta, which went down at Isle Royale a number of years ago with terrible loss of life. They have several other Lake Superior wrecks in mind that they will locate and salve.

The new steamer S. N. Parent of the Great Lakes & St. Lawrence company's fleet this week took on her first cargo here, consisting of 25,000 sacks of export flour for Quebec.

ATLANTA-DOLPHIN RACE A GHOST STORY.

A brief history of the Cramp ship yard, which went the rounds of the technical press recently and was printed in these columns April 30, contained a paragraph dealing with an alleged race on Long Island sound between Jay Gould's yacht Atlanta and the United States dispatch boat Dolphin. A correspondent in New York who is very well posted regarding all American-built vessels of note, pronounces the Atlanta-Dolphin race a ghost story.

"Nothing of the kind ever occurred," he says, "and the race on which the story was founded was a very different affair, being the first and last annual regatta of the American Yacht Club, held in the summer of 1884, from Larchmont to New London. Some twenty or thirty steam yachts participated, and the two in the first class were Gould's Atlanta, built by the Cramps in 1883, and John Roach's Yosemite, built in 1880 for Wm. Belden of New York, but afterwards taken back by the builder. John Roach was on the Yosemite but Gould was not on his boat at all. The Atlanta was the larger and newer yacht, and won the race, going into New London some two hours ahead. That the defeat of the Yosemite was so crushing, however, was due to accident. In the first place, by some inexcusable blunder, one-half of the high-pressure cut-off valve, which was in two parts working in the back of the main valve, had been put in upside down and in consequence the steam in that cylinder was following about three-quarter stroke on one end and one-quarter on the other, an arrangement hardly conducive to getting the best results

from the engine. Consequently when the Atlanta got away in the lead at the beginning of the race, she began to leave us steadily and in an hour was nearly out of sight, the weather being rather thick and misty. When the Yosemite was about half way over the course, which is about 80 knots, a manhole gasket on a boiler blew out, filling the boiler house with steam and, as it was impossible to get at it, there was nothing to do but run the steam down until the trouble could be located and determined and then keep it down, so that a number of other boats, even smaller ones, beat us into New London, much to the disgust of Mr. Roach and everyone else on board. The Dolphin was not finished until the next year and therefore could not have been in this race, and was never intended for a fast boat anyway, only 15 knots. I was on the Yosemite in that race and so I know what I am talking about."

PROGRESS OF NAVAL CONSTRUCTION.

In the monthly summary of naval construction, issued by the bureau of construction and repairs, fair progress is again shown in work on the large vessels. The contest between the New York navy yard and the Newport News company as regards the duplicate battleships which they are building, Connecticut and Louisiana, again shows 3 per cent. progress for each, the same as in March. The summary follows:

Name.	Building at	Degree of completion.	
		Apr. 1.	May 1.
Battleships.			
Missouri.....	Newport News Co.	90	91
Ohio.....	Union Iron Works	71	73
Virginia.....	Newport News Co.	26	28
Nebraska.....	Moran Bros. Co.	17	19
Georgia.....	Bath Iron Works	22	25
New Jersey.....	Fore River Ship & Engine Co.	32	34
Rhode Island....	Fore River Ship & Engine Co.	31	34
Connecticut.....	Navy Yard, New York	6	7
Louisiana.....	Newport News Co.	4	9
Armored Cruisers.			
Pennsylvania....	Cramp & Sons	47	48
West Virginia...	Newport News Co.	48	50
California.....	Union Iron Works	24	26
Colorado.....	Cramp & Sons	50	53
Maryland.....	Newport News Co.	45	47
South Dakota...	Union Iron Works	24	26
Tennessee.....	Cramp & Sons	0	0
Washington.....	New York Ship Building Co.	0	0
Protected Cruisers.			
Denver.....	Neafie & Levy	88	90
Des Moines.....	Fore River Ship & Engine Co.	82	85
Chattanooga....	Lewis Nixon	71	72
Galveston.....	Wm. R. Trigg Co.	66	66
Tacoma.....	Union Iron Works	69	71
Cleveland.....	Bath Iron Works	94	95
St. Louis.....	Neafie & Levy	16	17
Milwaukee.....	Union Iron Works	14	16
Charleston.....	Newport News Co.	33	35
Monitor.			
Florida.....	Lewis Nixon	99	99
Torpedo Boat Destroyers.			
Hopkins.....	Harlan & Hollingsworth Co.	96	98
McDonough.....	Fore River Ship & Engine Co.	98	99
Torpedo Boats.			
Stringham.....	Harlan & Hollingsworth Co.	98	98
Goldsborough...	Wolff & Zwicker	99	99
Blakely.....	Geo. Lawley & Son	99	99
Nicholson.....	Lewis Nixon	98	98
O'Brien.....	Lewis Nixon	98	98
Tingey.....	Columbian Iron Works	95	96
Submarine Torpedo Boats.			
Plunger.....	Lewis Nixon	99	99
Grampus.....	Union Iron Works	94	100
Pike.....	Union Iron Works	93	100
Porpoise.....	Lewis Nixon	99	99
Shark.....	Lewis Nixon	99	99
Steel Tugs.			
Pentucket.....	Navy Yard, Boston	60	70
Steel Tug.....	Navy Yard, Mare Island	4	13

It is reported that the United States Ship Building Co. is likely to be reorganized in the near future. It is understood that the North American Company and the Schwab interests are in accord in their recognition of the necessity of reorganization. Last week 300 shares of its common stock sold at 2 on the stock exchange. Bonds have sold as low as 44 but some sales have been negotiated at 50.

The year book of the American Power Boat Association, published by the Rudder Publishing Co. of New York, is just out. It gives the articles of the association, the racing rules and time allowance tables.

NOTES FROM PHILADELPHIA AND VICINITY.

Philadelphia, May 13.—The much-talked of reorganization of the Pusey & Jones Co., Wilmington, took place on Saturday last, when the Puseys connected with the company resigned and their positions were filled by William R. Brinckle, John S. Russell and James A. Hart, all officers of the Security Trust & Safe Deposit Co. It was announced that the trust company would finance the concern, and that it would continue the business of manufacturing paper and sugar mill machinery and building steel vessels as heretofore.

President David C. Reed of the Harlan & Hollingsworth Co., Wilmington, has secured a contract for the construction of complete machinery for a large side-wheel ferry boat for a transportation company at Rio de Janeiro, South America. The company will also construct the boilers. The Parthian of the Boston & Philadelphia Steamship Co.'s fleet arrived at the Harlan & Hollingsworth yard Saturday. She was badly damaged in a recent collision and will receive extensive repairs. The Admiral Farragut of the American Mail Steamship Co.'s fleet and the Truma, a Norwegian tramp steamer, are also at this yard and will receive repairs. The new Ericsson steamer, the Penn, launched several days ago, will be completed June 15 and go into service between Baltimore and Philadelphia at once. Her length over all is 203 ft.; extreme beam, 23 ft. 10 in.; draught, 9 ft. The Penn will have a speed of 19 miles an hour. She will be fitted with triple-expansion engines and four water-tube boilers of the Almy type. She will have hand and steam steering gear and an 8-ft. bronze propeller. Her electric light plant will have a capacity of 160 lights, together with a 12-in. search light. The twin sister of the Penn, which is being constructed at the same yard, is to be named the Lord Baltimore instead of Cecil.

Another Clyde liner, the Kiowa, was successfully launched from Cramps' ship yard Saturday. The Kiowa is a sister ship to the Huron, which was launched Oct. 25, 1902. She is intended for freight service between Boston and Jacksonville. At the launch Miss Elizabeth Milne, a niece of B. Frank Clyde, broke the baptismal bottle. The Kiowa is so nearly completed that within a month she will take her place in regular service. She is built of steel throughout and is 300 ft. long, 43 ft. beam and 30 ft. depth, and is calculated to steam 11 knots an hour. Her gross tonnage is 2,949 and the net 2,254. The ship is designed essentially for cargo, and is especially fitted for handling southern merchandise. She has every improvement in the line of hatch cranes and steam hoisting gear and is supplied with a complete electric light plant.

Capt. Sanford of the United States engineer corps, recently succeeded Col. Raymond in charge of the Philadelphia office. Capt. Sanford will have charge of the vast improvements to the Delaware river channel, a work the Maritime Exchange of the Quaker City is very much interested in. Fearing that the work of river improvements would be held back or retarded, the Maritime Exchange sent the following committee to Washington last Friday to have the matter settled: Frank Neill, chairman; President John S. W. Holton and Vice-President P. F. Young. The committee visited Col. Mackenzie, at the war department, and was positively assured that the improvements to the river channel would be pushed with vigor along the lines laid down by the chief of engineers and strictly in accordance with the several acts of congress under which the construction of the 30-ft. channel is authorized.

Henry G. Morse, president of the New York Ship Building Co., reached Camden Monday, having sailed from London May 2 on the steamship Minnehaha. With Mr. Morse's return, it is certain that a number of improvements to the yards and buildings will be started. The recent strike of the Philadelphia carpenters has delayed Contractor Gilpin in the erection of the large annex to the draughting rooms of the office buildings, and it may be that the ship building company's own men will be put to work completing the building. The addition is very much needed as there is a vast amount of draughting work on hand, including the plans for the new United States cruiser Washington. The force of draughtsmen has recently been increased by the addition of some twelve or fifteen very capable men.

The order from the navy department that the receiving ship Minneapolis at League Island navy yard go into commission June 6 will probably be changed on account of the fear that spotted fever, which recently made its appearance among the 1,200 young sailors on this vessel and the Puritan, would become epidemic. The embryo sailors have been hustled into camp and meanwhile the ships are being thoroughly fumigated. If all goes well the Minneapolis will leave June 6 or shortly thereafter for a five-months' cruise. Her destination has not yet been announced. She will carry 400 men. From now on recruits, if accepted, will be taken aboard the receiving ship Franklin at Norfolk. By the time the Minneapolis is ready to leave, the Lancaster, now being refitted to take her place, will be ready to dock. Improvements to the Panther are being hurried as it is thought she will go into commission June 3. Twelve days later she will leave for a three-months' cruise along the Atlantic coast, taking with her 450 landsmen and her crew.

The order of Secretary of the Navy Moody replacing naval officers at branch hydrographic offices with civilians has caused dissatisfaction among ship owners of Philadelphia. Several ship owners point to the fact that the men in charge of the branch

hydrographic offices have among his duties the collection of weather and meteorological reports from captains of vessels, the keeping of records of wrecks, changes in channels, etc., necessary for the correction up to date of government charts. Besides these duties, these officers furnish to captains of vessels outward bound all information of menaces to navigation and compare and regulate their chronometers and other instruments. It is the impression that a naval officer, by reason of his scientific training and his practical experience at sea, is the proper person to carry the responsibility of advising shipping men on the technical dangers and changes with which a landsman is incompetent to deal. Lieutenant Harry M. Jacobs, who is in charge of the Philadelphia office in the Bourse building, has not yet received orders relieving him from duty.

The Philadelphia & Reading Railway Co. has decided to store immense quantities of coal near the great shipping ports of Philadelphia and New York. Work upon two new reserve plants, one at Bridgeport, Pa., the other at Port Reading, New York, is to be pushed as rapidly as possible. It is said 500,000 tons will be stored at Bridgeport. The company proposes to build at Port Reading, along the water front, immense bins, from which colliers can be loaded without any rehandling of the coal.

The iron workers' strike at the Crescent ship yard, Elizabethport, N. J., was settled a few days ago. The boiler makers secured an increase of 50 cents a day and the other workers ten hours' pay for eight hours' work. Four hundred men resumed work.

President Holton of the Philadelphia Maritime Exchange announced important committees last week, among them the following committee which will look after the launch at Cramps' ship yard of the armored cruiser Pennsylvania: J. S. W. Holton, F. L. Neall, C. F. Giller, D. S. Stetson, P. F. Young, I. A. Ball and S. B. Macdonnell.

The federal government will erect a life boat building at Atlantic City. The new edifice will be near the water's edge and the life boat is to be swung over a railway. When an alarm is rung the boat can thus be more quickly lowered than slipped into the water. On the new building there will be added a tower in which will be located the government lookout for vessels in distress and for signals which passing vessels may want to send ashore.

The new cruiser Denver, nearing completion at Neafie & Levy's yard, had a trial of her engines last week. She went down the Delaware as far as the capes. Her machinery is reported to have worked perfectly on the run and she proved to be handy in answering her helm. The date of her official trial trip has not yet been fixed.

Richard H. Rushton, one of the Cramp voting trustees, said last Saturday: "The report that no dividend on the William Cramp & Sons stock will be paid for three years is no more than mere conjecture. No decision can be reached on that point at this time. The new board of directors has not yet been selected, nor has a date been fixed for doing so."

The Philadelphia & Reading ferry boat Ocean City, built at Neafie & Levy's ship yard, has been placed in regular service between Philadelphia and Camden. Her dimensions are: Length over all, 169 ft.; extreme width, 55½ ft. She is built of steel and has all modern improvements.

The annual report of the Philadelphia Bourse, made public May 6th, shows that the receipts were \$196,203; expenditures, \$104,284; balance, \$6,159. At the annual election May 12 seven new directors will be elected. The following nominees are mentioned: George E. Bartol, Frederick Schoff, C. E., William R. Tucker, William W. Supplee, Mahlon N. Kline, William H. Arrott and John C. Dawson.

The steamship Florida, changed at Philadelphia to a bulk oil carrier, has been sold to the American-Hawaiian Steamship Co. and will ply between Texas points and St. Thomas, W. I.

Pusey & Jones, at their Wilmington, Del., yard, are building a steel tug 70 ft. long, 18 ft. beam and 7 ft. 6 in. draught, which will do service on the Delaware.

The steamship Lattimer, built for the J. M. Guffey Co. of Pittsburg, will be launched at the works of the New York Ship Building Co., Camden, next Saturday. Several officers of the Guffey company will be present and it is likely they will remain over until Monday to go down the Delaware on the Ligonier which was launched for the Guffey company three weeks ago.

Plans have been completed for the new engineering building of the University of Pennsylvania in Philadelphia. It will be 30 ft. long, 160 ft. deep, with a wing 50 ft. wide on the west, and extending 40 ft. to the rear. It is to be of three stories with basement and of handsome architectural design. In it will be the hydraulic room and marine engineering room.

John M. Ballentine, who was connected with Roach's ship yard since the plant was projected, died at Chester, Pa., May 7, aged 71 years.

A tug boat named Credena was launched a few days ago from Paul's ship yard, Paulsboro, Me.

James Scully, tug boat and barge owner of New York, has purchased the Echo, an ocean-going tug which recently came to Philadelphia from the south. He has renamed the vessel James Scully and will take her to New York.

It is estimated that the value of war vessels building for the

government on the Delaware is \$22,000,000 and of vessels of all kinds over \$40,000,000.

The new steel tank steamer, the Col. E. L. Drake, built by Cramps for the Standard Oil Co., made a quick run on her maiden voyage between Philadelphia and Charleston last week, with Capt. Rubelli in command. She covered the 510 miles between the two ports in 32 hours.

It is expected that the steamer Virginia building at the Sparrow's Point (Md.) ship yard for the Chesapeake & Ohio Ry. will be completed within the present week.

IMMENSE EXPENDITURES FOR WARSHIPS.

Glasgow, May 4.—The four scouts embraced in this year's naval program will be built, it is stated, by the firms now constructing the ships of the same type authorized under last year's program. These firms are Fairfield Co., Vickers Sons & Maxim, Armstrong, Whitworth & Co. and Laird Bros. Effort has been made to bring about close similarity in these vessels. The Vickers ship is the largest, her displacement being 2,900 tons, and the machinery is of 17,000 I. H. P., in order that 25 knots may be realized with a load of 150 tons on board. The Fairfield ship is the smallest, being 2,545 tons. Armstrong's is 2,750 tons and Laird's 2,610 tons, these three having engines of 16,000 I. H. P. The Vickers ship is the broadest with 1 ft. of breadth to every 9 ft. of length, while the Fairfield ship has 1 ft. to 9.35 ft., Laird's 1 ft. to 9.47 ft., and the Elswick ship 1 ft. to 9.73 ft. The Armstrong ship is 370 ft. long with a beam of 38 ft. and a draught of 13 ft. 3 in. In Laird's ship the breadth and draught is the same, but the length is 360 ft. The Fairfield and Vickers ships are the same length, 360 ft., but the Fairfield ship has a breadth of 38 ft. 6 in. and a draught of 13 ft. 1 in., while the Vickers boat is 40 ft. broad, and of 14 ft. 2 in. draught. All the ships will have the same capacities for coal, stores, guns and ammunition, the principal armament being ten 12-pounder guns.

Apropos of the naval program, the following are the new vessels laid down during the past six years, with the ships under this year's program.

	Battle-ships.	Armored cruisers.	Other cruisers.	Small craft.
1897-98	4	4	3	16
1898-99	7	6	0	4
1899-1900	2	4	1	4
1900-01	2	6	1	6
1901-02	3	6	2	22
1902-03	2	2	6	17
1903-04	3	4	7	28

The figures for the last two years include four scouts. In 1897-98 the dock yards had three battleships, and the private yards a battleship and four armored cruisers. In the next year the dock yards had three battleships and a cruiser, while the private yards had four battleships now undergoing trials and five armored cruisers. In 1899-1900 the private yards had the armored cruisers Monmouth and Bedford, while the dock yards had two similar ships as well as two battleships. In the next year only one battleship and one armored cruiser was ordered from the dock yards, while the contracts included two battleships and five cruisers of the improved County class. Last year the dock yards had the battleship New Zealand and the Clydebank Co. the Hindustan, while Pembroke got the Duke of Edinburgh, and the Thames Iron Works Co. the Black Prince. This year the dock yards only get one cruiser, and the remainder of the forty-two ships go to contractors. Also £650,000 of the £1,417,000 laid aside for repairs to ships in home ports is to go to contractors. The total vote for ship building, repairs, maintenance, etc., is £17,820,000, and £3,300,000 is to be spent on armaments.

The sum already allocated for admiralty work now in progress in Scotch works is £2,382,000—£218,000 more than in the year just closed and £172,000 more than in 1901-2. In other districts, also, there is a considerably greater increase, the Tyne having advanced from £740,000 two years ago to £1,607,000 for the new financial year, and the Mersey total from £386,000 to £789,000. In addition to the millions odd directly allotted to Clyde ships, a considerable sum must come to Scotland for auxiliary machinery, such as Napier's gear, Weir's pumps, and other items as common on warships almost as guns or torpedo tubes. The relative proportions of the districts for some years is recorded in the appended table:

WARSHIP BUILDING CONTRACT EXPENDITURE IN VARIOUS DISTRICTS.

	1903-4	1902-3	1901-2	1900-1
Clyde	£2,382,000	£2,164,000	£2,210,000	£2,170,000
Tyne	1,607,000	966,000	740,000	681,000
Thames	1,460,000	793,000	884,000	1,057,000
Barrow	858,000	876,000	888,000	1,047,000
Mersey	789,000	334,000	386,000	528,000
Belfast	137,000	153,000	60,000	4,000
Hull	—	6,300	34,700	76,500
Cowes	130,700	55,000	—	—

Of the Clyde firms John Brown & Co., Clydebank, get the largest share, namely, £724,600, including armor for the Clydebank ships. This is made up of a large vote for the battleship Hindustan, and by £300,000 for the armored cruiser Antrim, and a small sum for the machinery of the Essex. The Fairfield company's share is £586,400, including armor, which, however, they do

not themselves make. The greatest part of this £364,000 is for the battleship Commonwealth, which is to be commissioned in 1904-5 practically direct from the works of the company. The Donegal is to be finished for commission before the year is out, and for her £79,000 is allotted. The vote for the scout Forward makes up the company's total. The London & Glasgow Ship Building Co. complete the Cumberland for £120,000, and will advance the Roxburgh to the extent of nearly £300,000. Messrs. Scott & Co., Greenock, will furnish at their foundry the machinery of the battleship Prince of Wales, for £46,359, and will advance the armored cruiser Argyll to the extent of £320,000. Messrs. Beardmore & Co. have the Berwick and the Carnarvon, two armored cruisers. The vote for the hull of the former is £63,990 and for the latter £201,500.

The largest amount to be earned by any private builder from the admiralty this year is by Vickers Sons & Maxim, Ltd., Barrow-in-Furness, who will receive \$857,800. This does not, however include guns, gun mountings or projectile work carried on at the Barrow works, and which with the armor made at the Sheffield works of the company for other ships, will bring this company's total to nearly three millions sterling. Their ship building vote includes the Dominion, the Sentinel, one of the scouts, and the submarines. The following table shows past and prospective expenditure on contract yards:

	1903-4	1902-3	1901-2
Vickers, Barrow	£857,800	£876,000	£888,000
Laird, Birkenhead	789,000	334,000	386,000
J. Brown & Co., Clydebank	724,600	340,000	599,900
Fairfield Co.	586,400	823,000	831,700
Hawthorn-Leslie, Newcastle ..	526,500	351,300	220,400
Palmers Co., Newcastle	513,400	225,300	261,500
Thames Iron Works	492,200	228,400	702,000
London & Glasgow Co.	440,300	523,600	477,700
Sir W. G. Armstrong, Whitworth & Co.	373,080	239,800	—
Scott & Co., Greenock	365,000	199,000	60,000
Thornycroft, London	360,000	144,000	—
Humphrys-Tennant, London ..	309,400	284,800	—
Yarrow & Co., London	300,000	120,000	—
W. Beardmore & Co., Glasgow ..	265,500	278,300	200,000
Parson's Turbine Co., Newcastle..	182,800	123,000	—
Harland & Wolff, Belfast	137,000	153,000	—
White, Cowes	130,700	55,000	—
Wallsend Co., Newcastle	10,700	46,200	—

Messrs. Laird Bros. have machinery work to complete on two battleships, two third-class cruisers, a scout and six destroyers, which are all to be ready for commission before next March. On the Tyne, Messrs. Hawthorn, Leslie & Co., have the machinery for four armored cruisers, building elsewhere, in addition to two destroyers; Palmers Co. have the third-class cruiser Sapphire and five destroyers, while the Armstrong company have two armored cruisers, Lancaster and Hampshire, a third-class cruiser, the Amethyst, and a scout, the Adventure. The Thames Iron Works have the machinery for the Albemarle and Duncan, battleships, to finish, although both have passed through their trials, and they have the sister ship Cornwallis to complete. Messrs. Thornycroft and Messrs. Yarrow's votes are made up of torpedo craft, as is also Whites of Cowes, with the addition of the engines of a sloop.

The second-class cruiser Hermes, having had her Belleville water-tube boilers taken out and replaced by twelve Babcock & Wilcox water-tube boilers, has been commissioned at Chatham for special service. Afterwards she will join the channel squadron. The Hermes is placed at the disposal of the boiler committee for a special series of tests of the Babcock & Wilcox water-tube boilers, fitted in at the works of Harland & Wolff, where she has been refitted at a cost of over £35,000. The Hermes after the trials will replace the second-class cruiser Furious, which has been paid off from the channel squadron for refit. The Hermes only had fourteen months service out of her Belleville boilers.

SHIP YARD NOTES.

Kelley-Spear Co., Bath, Me., are to build a barge for the Baltimore Boston Barge Co. She will have a carrying capacity of about 2,500 tons.

A. M. Webster, Vinalhaven, Me., is building a three-masted schooner of the following dimensions: Length over all, 142 ft.; beam, 34 ft.; depth, 10 ft. She will be named Margaret A. Ford and will be launched in August.

Thomas McCosker, Baltimore, Md., has just completed the tug Defiance for the P. Dougherty Co., of the same city. She is a wooden tug, 118 ft. long, 25 ft. beam and 11 ft. deep. She has a compound engine with cylinders 14 and 32 in. in diameter and stroke of 24 in. A steel boiler, measuring 11 by 11 feet, furnishes steam at 150 lbs. pressure.

Contracts for two large car floats to be constructed of steel have been awarded by the New York, New Haven & Hartford Railroad Co. to the Eastern Ship Building Co., of New London, Conn. The floats will be 318 ft. in length and 38 ft. breadth, and will be delivered within six months. The floats will be built on the ways recently vacated by the launching of the steamship Minnesota for the Great Northern Steamship Co. They will be built tandem and occupy the entire length of the ways.



LESS ORE ON DOCKS THAN WAS EXPECTED.

It was expected in vessel circles, as well as among the ore shippers, that stocks of iron ore on Lake Erie docks May 1 would exceed 4,000,000 gross tons, first on account of the great output from the Lake Superior region last season—27,571,121 tons—and again because of the inability of the furnaces to work to full capacity during the long period in which they could not get all the coke that was needed. The ore was evidently moved to the furnaces in very large quantities during April, as reports from all the Lake Erie dock managers to the Marine Review show a total of only 3,592,367 tons on dock May 1, compared with 2,848,194 tons on the same date a year ago and 3,050,183 tons on May 1 two years ago. The total of more than three and a half millions now on dock is large, of course, but not large compared with what was expected. No account is taken in these figures of furnace stocks. Neither do they include ore placed on dock in April of this year, but that item was very small, only 85,785 tons. Practically all the ore brought down in April was shipped direct to furnaces.

A striking feature of these statistics is the amount of ore moved over Lake Erie docks to furnaces in the full year ended May 1, namely, 21,905,251 tons, as against 17,216,065 tons for the year ended May 1, 1902, or an increase of 4,689,186 tons. Shipments to furnaces over Lake Erie docks during the year just ended are more than double what they were in 1898, five years ago.

Figures showing the total ore passing to furnaces over Lake Erie docks in the year ended with the first of the present month are found in this way: We know that on Dec. 1, 1902, Lake Erie docks contained 7,074,254 tons of ore. If we deduct from this 3,592,367 tons, the amount now on dock, we find that shipments to furnaces from Lake Erie ports during the winter period (Dec. 1 to May 1) amounted to 3,481,887 tons, which, added to 18,423,364 tons, the amount shipped to furnaces during the navigation season in 1901, gives 21,905,251 tons as the entire consumption of ore from Lake Erie ports during the year ended May 1, 1903, against 17,216,065 tons in the year ended May 1, 1902; 14,468,260 tons in the year ended May 1, 1901; 15,882,881 tons in the year ended May 1, 1900; 12,122,982 tons in the year ended May 1, 1899, and 10,209,488 tons in the year ended May 1, 1898. The following tables give full details of stocks and shipments to furnaces during several years past:

IRON ORE ON LAKE ERIE DOCKS—GROSS TONS.

PORTS.	OPENING OF NAVIGATION.			CLOSE OF NAVIGATION.		
	May 1, 1903.	May 1, 1902.	May 1, 1901.	Dec. 1, 1902.	Dec. 1, 1901.	Dec. 1, 1900.
Toledo	126,331	111,511	138,457	310,023	254,196	242,375
Sandusky	56,500	37,400	63,148	95,175	47,384	95,111
Huron	147,817	129,635	135,043	232,764	231,501	211,377
Lorain	190,311	96,992	140,562	328,304	195,863	251,838
Cleveland	829,347	624,865	806,119	1,500,604	1,378,060	1,337,445
Fairport	555,709	472,325	306,706	924,236	710,590	611,717
Ashtabula	1,073,967	924,742	1,046,974	1,967,136	1,769,145	1,811,459
Conneaut	125,400	152,891	69,755	673,679	604,106	630,514
Erie	426,744	223,972	225,412	722,966	470,718	480,734
Buffalo	60,241	73,861	118,007	319,367	198,100	232,100
Total	3,592,367	2,848,194	3,050,183	7,074,254	5,859,663	5,904,670

ORE ON LAKE ERIE DOCKS, MAY 1, EACH YEAR FOR TEN YEARS PAST.

Year.	Gross tons.	Year.	Gross tons.
1903	3,592,367	1898	3,167,915
1902	2,848,194	1897	3,256,497
1901	3,050,183	1896	1,949,698
1900	1,720,656	1895	2,642,890
1899	2,073,254	1894	2,588,370

ORE SHIPMENTS, LAKE ERIE PORTS TO FURNACES, FULL YEARS.

Year ending	Gross tons.	Year ending	Gross tons.
May 1, 1903	21,905,251	May 1, 1900	15,882,881
May 1, 1902	17,216,065	May 1, 1899	12,122,982
May 1, 1901	14,468,260	May 1, 1898	10,209,488

IRON ORE SHIPMENTS, LAKE ERIE PORTS TO FURNACES, DURING WINTER PERIOD, DEC. 1 TO MAY 1.

Winter of	Gross tons.	Winter of	Gross tons.
1902-03	3,481,887	1899-1900	3,809,627
1901-02	3,011,469	1898-99	3,063,153
1900-01	2,854,487	1897-98	2,755,840

Maj. J. G. Warren, government engineer at Milwaukee, has notified the Chicago & Great Lakes Dredge and Dock Co. that it has been awarded contract for dredging Waukegan harbor. The work involves an expenditure of \$350,000.

LAKE SUPERIOR TRAFFIC IN APRIL.

Reports from canal officials at the Sault give details of commerce to and from Lake Superior in April. Briefly stated the commerce of both canals, Canadian and United States, is 1,651,839 tons (net tons in all cases) to May 1 of this year, compared with 2,339,234 tons to May 1, 1902, or a decrease of 687,395 tons. The decrease is, of course, due to the later opening of navigation this year. In April, 1901, there was practically no traffic in the canals—only 2,545 tons. The canal report in full is as follows:

	Vessel passages.	Registered tons.	Freight tons.
To May 1, 1903	1,002	1,399,045	1,651,839
To May 1, 1902	1,679	2,322,879	2,339,234
To May 1, 1901	104	10,121	2,545

Movement of Principal Items of Freight to and from Lake Superior.

ITEMS.	To May 1, 1903.	To May 1, 1902.	To May 1, 1901.
Coal, anthracite, net tons	159,304	44,228	.....
Coal, bituminous, net tons	445,344	303,030	.....
Iron ore, net tons	698,437	1,492,051	.....
Wheat, bushels	5,922,468	9,408,933	.....
Flour, barrels	488,857	657,404	180

Report of Freight and Passenger Traffic to and from Lake Superior, from Opening of Navigation to May 1 of Each Year for Three Years Past.

EAST BOUND.

ITEMS.	To May 1, 1903.	To May 1, 1902.	To May 1, 1901.
Copper, net tons	6,311	4,469	.....
Grain, other than wheat, bushels	2,761,725	1,862,064	.....
Building stone, net tons .....	.....	2,151	860
Flour, barrels	488,827	657,404	.....
Iron Ore, net tons	698,437	1,492,051	.....
Iron, pig, net tons	40	1,092	.....
Lumber, M. ft. B. M	10,993	34,848	.....
Silver ore, net tons .....	.....	.....	.....
Wheat, bushels	5,922,468	9,408,933	.....
Unclassified freight, net tons	1,597	3,567	20
Passengers, number	1,822	2,238	285

WEST BOUND.

Coal, anthracite, net tons	159,304	44,228	.....
Coal, bituminous, net tons	445,344	303,030	.....
Flour, barrels	30	.....	180
Grain, bushels .....	.....	.....	23,530
Manufactured iron, net tons	3,231	3,070	.....
Salt, barrels	21,269	42,365	500
Unclassified freight, net tons	27,265	50,071	1,168
Passengers, number	2,030	2,822	500

Summary of Total Freight Movement in Tons.

	To May 1, 1903.	To May 1, 1902.	To May 1, 1901.
West bound freight of all kinds net tons	638,319	386,684	1,665
East bound freight of all kinds, net tons	1,013,520	1,952,550	880
Total freight, net tons	1,651,839	2,339,234	2,545

ASSOCIATION OF DREDGING INTERESTS.

The Great Lakes Tug & Dredge Owners' Protective Association, which has just completed work of organization by the election of a manager who will give his entire time to its affairs, does not propose to deal with prices of dredging, restriction of the different plants or to in any way interfere with competition in business. Members of the association are anxious to have this understood and support the statement by announcing that the entire workings of the organization will be opened up to examination by interested parties if desired. There are about twenty-five dredging concerns in the organization and the entire membership is undoubtedly in earnest accord with the plans of the new body. The recent movement towards the building of dredges by the government has stirred up this branch of lake industry and has undoubtedly had much to do with bringing the dredge men together for their own protection. The labor question is also one of prime importance with them—not opposition to the labor unions with whom they are now working under contracts, but a desire to be rightly organized in handling labor problems. Mr. F. B. Daugherty, recently elected manager, has had considerable to do with the business of several of the companies. His headquarters are at 1323 Chamber of Commerce building, Chicago.

"We hope," says one of the officers of the association, "to build up an organization upon lines that will command the respect of everybody with whom the dredging interests have dealings, as all that is contemplated is a course entirely within the business rights of our membership; simply a body dealing

with questions pertaining to dredging as other similar commercial organizations deal with their affairs. Briefly we will promote favorable and oppose injurious legislation; consider improvements in the construction of dredging machinery and apparatus and economy in work and methods best calculated to reduce cost and price of work; obtain dredging statistics; compare wages of labor and mutually promote the welfare of the dredging interests."

Working with President W. A. Lyden of Chicago and an executive committee made up of J. A. Smith of Cleveland, P. B. McNaughton of Buffalo, S. O. Dixon of Milwaukee, T. C. Lutz of So. Chicago and E. T. Williams of West Superior, Mr. Daugherty will give constant attention to the affairs of the association and is even now taking steps to become acquainted with leaders of the labor organizations and fully settle with them questions that were not clearly worked out when dredging operations were begun this spring.

Mr. C. J. Connell of Chicago is secretary and treasurer of the association. The vice-presidents are: C. Wiederman, Milwaukee; E. J. Hingston, Buffalo; W. C. Jones, Cleveland; John Breyman, Toledo; Michael Sullivan, Detroit; H. W. Hubbell, Saginaw; Henry Hickler, Sault Ste. Marie; Robert Smith, Duluth; Harry C. Lydon, Chicago; T. C. Lutz, So. Chicago; W. J. Daley, Ogdensburg; John R. Williams, West Superior.

LAKE SHIP YARD MATTERS.

Although it would seem that big steel freighters have been leaving the stocks almost every week of late from the several yards of the American Ship Building Co., there are still quite a number of vessels from the order list of the past winter that are barely under way and a few upon which work has not been started. Work on the big car ferries, for which orders were taken only a short time ago, will run into next winter. Three or four of the yards will be principally engaged during the next four or five months on the eight steamers of 6,200 tons capacity each for J. C. Gilchrist of Cleveland. These large freighters are all to be delivered during September and October, and two duplicate steamers building at the Columbia Iron Works, St. Clair, Mich., for the Gilchrist fleet, are also to be delivered late in the fall. Of the eight Gilchrist steamers building by the American company three are in Lorain, one in Cleveland, two in Chicago and two in Bay City. J. J. Lynn of Port Huron is negotiating with the Craigs of Toledo for a steel lumber steamer of about 245 ft. length for Pacific coast trade—a vessel similar to the one just built at Newport News and in which Mr. Lynn was interested. M. J. Galvin of Buffalo is working on a proposition to place two steel vessels of about 1,100,000 ft. capacity in the lumber trade on the Atlantic coast, running up from Savannah, and he is also getting figures from lake builders.

John Lambert is the name of the vessel launched at the Chicago yard of the American Ship Building Co. last Saturday for the Great Lakes & St. Lawrence Transportation Co. She was christened by Miss Fanny Davis, a stenographer at the Chicago yard.

John W. Gates has given an order to the Racine Boat Manufacturing Co., Racine, Wis., for a steam yacht to draw only 30 in. of water when loaded for a ten days' cruise. The vessel will be 100 ft. long with 17 ft. beam. The craft is to be delivered to Mr. Gates at Port Arthur, Texas, on Oct. 1.

Last Saturday the Manitowoc Dry Dock Co., Manitowoc, Wis., launched the steamer Chequamegon for the Chequamegon Bay Transportation Co. for service out of Ashland, Wis. She is a wooden vessel 112 ft. long, 22 ft. beam and 10½ ft. depth of hold.

The steamer Keefe, one of the ten steel canalers which the American Ship Building Co. is turning out for the Great Lakes & St. Lawrence Transportation Co., has just delivered her maiden cargo of coal at Duluth from Buffalo. Alexander Craigie is commander.

It is expected that one of the two steel steamers of about 5,000 tons capacity each building at the works of the Collingwood Ship Building Co., Collingwood, Ont., the one for J. H. G. Hagerty and others of Toronto, will be launched in a few days. The second big freighter at this yard is for James Playfair of Midland, Ont.

Repairs on the steamer Olympia at the works of the Ship Owners' Dry Dock Co., Chicago, are nearing completion. The work involves an expenditure of about \$14,000.

A FINE STEAMER—A MONEY-MAKER.

A steamship of 340 ft. keel, well suited to care for 350 passengers, just as they are cared for on Atlantic liners (not on the excursion order), and still having space for 3,500 tons of freight, with facilities for handling it in the rapid manner in which freight is handled on the great lakes; such a ship, with quadruple-expansion engines of 2,500 H. P., producing a speed of 15 miles an hour for regular service and capable of 18 miles, is the Tionesta, just completed by the Detroit Ship Building Co. for the service of the Anchor Line between Buffalo and Duluth. And the cost of this vessel was not more than \$475,000. The Tionesta was fully described and illustrated to the extent of two or three pages in the Review of Dec. 18 last, when she was launched. On Monday of this week she was given a short trial run out of Detroit. Mr.

Frank E. Kirby, designer of the vessel, and other officials of the ship building company, as well as Messrs. E. T. and J. C. Evans of the steamship company were aboard, and it was clearly evident that they think they have an ideal vessel for the service in which she is to be engaged. Everybody with a knowledge of the kind of vessel required for Lake Superior tourist travel is of the same opinion and convinced also that experience has enabled designer and manager, working together, to produce a ship that will prove profitable. Two more steamers of the same kind were contemplated when the order for this one was given to the Detroit company, and it is now more than probable that the Anchor Line will find it absolutely necessary to place these orders before the Tionesta's first season is half over with. She is unlike any vessel in lake service and is sure to prove popular. The outward design bears the appearance of a magnificent ocean-going vessel of moderate size. The first impression following a glance over the main deck is that "here is the broad open space of the lake package freighter with all the facilities for rapid loading and unloading of cargo." But this part of the vessel need not be even noticed by the passenger who goes aboard through a main entrance amidship that is entirely separated from the freight space. Above on berth deck, promenade deck and upper deck everything is of ocean-liner order, and in some respects such as running water in all the staterooms, the conditions on the lakes admit of improvements over the best ocean practice.

The Tionesta is bound to prove a most popular boat and there is no hazard in predicting that she will be the forerunner of a very high order of passenger service to Lake Superior in three or four vessels of her kind.

TO INSPECT EUROPEAN WATERWAYS.

Hon. Theodore E. Burton, chairman of the committee on rivers and harbors of the house of representatives, will leave on Thursday next upon a tour of inspection of European waterways. Mr. Burton will very probably be accompanied by Harvey D. Goulder of Cleveland. Mr. Burton and Mr. Goulder have been friends since their school days and have looked forward to a European trip for a long time past. Mr. Burton will be away from home for four or five months, but Mr. Goulder will probably not be with him for more than a couple of months. Mr. Goulder goes for a rest, but in view of his interest in waterways and in everything that pertains to transportation, he will profit by the investigations which Mr. Burton is to make on account of the important position which he holds with reference to the great expenditures of the government on account of rivers and harbors. Mr. Burton has not fully mapped out the course of his trip as yet. A great deal will depend upon the suggestions of Capt. F. G. Mahan, a retired army officer, and a brother of the well-known naval officer of that name, who is considered an engineering expert. Capt. Mahan is now in Paris and Mr. Burton and Mr. Goulder will very probably go direct to Paris to meet him. Broadly Mr. Burton's purpose is to inspect the waterways of Europe, the care of harbors, rivers and canals and the relation of railway to water transportation. The state department will concern itself in the trip to the extent of instructing the representatives abroad to secure for Mr. Burton the assistance of the proper officials of the various governments.

Probably before inspecting the canals and canalized rivers of France and Germany a trip will be made down the Danube and up the Volga, or vice versa, this depending upon what may develop after meeting Capt. Mahan and going over the matter with him. Mr. Burton will in any event take sufficient time to not only investigate the waterway improvements of Europe—the works themselves—but also to become acquainted with methods attending the provision of funds for such improvements and with the commercial questions involved. It goes now without saying that no better man than Mr. Burton could possibly be selected for such a trip as this. His experience has been of the most varied character and no man is more familiar with American waterways than Mr. Burton. Naturally Europe has much to offer on the subject of waterway study. It had canals before America was discovered and it has constructed several artificial waterways since. Undoubtedly Mr. Burton will find much to aid him in formulating plans for the development of American waterways. The United States is entering upon an era of improvement in means of water carriage of which the Panama canal and Erie canal enlargement are among the more important. Then there is the question of improving the rivers which is very debatable ground and upon which much is yet to be learned.

Vessels classed and rated recently by the American Bureau of Shipping in the Record of American and Foreign Shipping are: American screw steamer New York; American schooners Washington B. Thomas and Frederick A. Dugan; American barkentine Westfield; American terns Josephine Ellicott, Gertrude A. Bartlett, Doris, Alice McDonald and Hattie Dunn; British tern Wandrian; Swedish schooner Framat; Swedish barkentine August, and Swedish galiot Georg.

Capt. J. R. Johnson, Clarksville, Tenn., will shortly let the contract for a new steamboat 120 ft. long, 18 ft. beam and 3½ ft. deep.

AROUND THE GREAT LAKES.

The harbor at Holland, Mich., is being dredged to a depth of 17 ft.

John Deveny of Ashtabula has sold the tug Thomas R. Ball to J. L. Calkins of Port Wing.

The Lake Carriers' Association has decided to abolish the office of shipping master at Milwaukee and has so notified Capt. William Jamieson, the incumbent.

Mr. J. C. Gilchrist has added another vessel to his fleet, the wooden steamer Case, which was formerly the J. C. Lockwood. She carries about 3,000 tons of ore.

The large steel tow barge D. Z. Norton, recently purchased by the Huron Barge Co., one of the Pickands-Mather organizations of Cleveland, from the Wilson Transit Co., will be towed by the steamer Pathfinder.

Capt. Charles L. Potter, the newly appointed United States engineer for the Lake Superior district, is expected to arrive in Duluth and to assume the duties of his district about May 31. He has been ill for the last two months.

John Stark, a well known marine engineer, died at Grand Haven, last week. He had sailed the lakes for over fifty years but retired from active service several years ago. For a period of four years he was an inspector of boilers at Grand Haven.

The Montreal Transportation Co. has purchased the steamer Bothnia from the Pennsylvania Coal Co. The Bothnia has been engaged in carrying coal from Charlotte to Ogdensburg. The new owners will use the steamer in general lake transportation.

A new chart in colors, Lake Huron No. 7, showing the northeast coast of Lake Huron, including the entrance to Georgian bay and the eastern end of the north channel, has just been issued by the United States lake survey and may be had from the Marine Review.

Examinations will be held by the civil service commission on June 9 and 10 and June 16 and 17 to secure eligibles for the positions of inspector of boilers and inspector of hulls at Chicago. Both places are temporarily filled and the present incumbents will probably attain their positions but must meet other applicants, if any there are, in the competitive examinations.

Capt. Henry Kelley, one of the oldest vessel men on the lakes, died at his home in Milan last week. He was born on March 1, 1816, and at the age of sixteen became a sailor. He eventually established a ship yard at Milan and a number of wooden schooners are to be credited to him. The last vessel which he built was the Our Son, in honor of his deceased son. He was the principal owner of the Iroquois which is managed by W. C. Richardson of Cleveland.

The resignation of Capt. Z. Montague from command of the steamer Cornell has caused a number of changes to be made in the masters of the Steel Corporation fleet. Capt. Samuel Allen, who was in the steamer Robert Fulton, takes the Cornell. Capt. W. J. Hunt goes from the Corsica to the Fulton; Capt. James H. Buchanan, who was on the Colgate Hoyt, takes command of the Corsica, and Capt. George Holbridge, who was on the barge Smeaton, has been made master of the Colgate Hoyt.

Excellent prospects for a good season's business are reported by the Barry Transportation Co., which is operating the steamers Badger State and Empire State between Cleveland and Detroit. Little is expected in the way of passenger traffic until midsummer, but a large number of merchants and manufacturers in Detroit as well as Cleveland are disposed to encourage competition on this route and will patronize the new line on that account. Mr. A. E. Thompson, who was Cleveland agent for the Union Transit Co. for a number of years, is general freight and passenger agent of the Barry Line.

A Chicago dispatch says: "Vesselmen interested in the turning basins proposed for the north and south branches of the Chicago river hope for early action toward the completion of the project. With the passage of a bill bestowing on the government state land desired for the south branch improvement the last obstacles, save the opposition of the Chicago, Milwaukee & St. Paul Railway and the People's Gas Co., were swept aside. With the condemnation suits ended the basin work could be started at once, \$500,000 having been appropriated for the purpose. Each basin will be 700 ft. in diameter.

Preparatory to the eventual erection of a bridge over the Detroit river the bridge engineers are now taking measurements of vessels. Every vessel that passes is accurately measured from water line to masthead. An observatory has been built at Walkerville from which by means of a theodolite the measurements are made. This is but part of the amazing data needed to build such a structure as a bridge. The purpose is to make the bridge high enough for existing craft to pass safely under it. It is not likely that in the future vessels will be built with masts as high as those now in existence, so that a span which passes present craft will pass all future craft. Steam has almost entirely supplanted sail on the lakes.

Following the purchase recently of the Toledo Fuel Co.'s marine plant at Toledo, including docks, machinery, etc., the firm known as Stanley B. Smith & Co. of Toledo has incorporated its business. The new organization is to be known as the Stanley B. Smith Coal & Dock Co. of Toledo. The capital stock is \$500,000 fully paid in, and the officers are as follows. President Stanley B. Smith of Detroit; vice-president and treasurer, Alexander W. Beal of Detroit; secretary, N. S. Monsarrat of Toledo;

general manager, A. M. Donovan of Toledo. The corporation takes in only the Toledo business. Stanley B. Smith & Co. of Detroit still operates Smith's coal dock, Detroit river, and continues in commercial coal business.

A Saginaw correspondent says: "Capt. M. Madden of this place, whose death was announced in your last issue, was of sterling character and had a great many very warm friends in all parts of the lakes. He commanded quite a few vessels in his time, beginning with the tug H. A. Ballentine. From the Ballentine he went to the W. B. Moore; then he was in the Kershaw for two years, and later in the steam barge Ballentine when she was one of the largest vessels on the lakes. He was part owner of the O. W. Cheney, now at the Sault locks, and operated her on the Saginaw river for two years. Then he sailed the C. H. Green for several years, the Ohio for two years, the City of Paris for two years, the Genoa for a year or two, the L. S. Porter and the City of London for two years. He was master and part owner of the E. A. Shores until his health failed about eighteen months ago.

CANADIAN SHIPPING NOTES.

Ship building interests on the Atlantic coast and those on the great lakes have been applying to the Dominion government for a bonus for the building of steel ships in Canada. The coast men ask for \$5 a ton, while the builders on the great lakes will be satisfied with \$3 a ton. It is not likely that the government will grant a larger bonus than \$3 a ton, if any bonus at all is decided upon.

The Vancouver Ship Masters' Association has passed a resolution stating that no member of the association shall take a position on any vessel from which another member has resigned on account of low wages, small crew or unjust treatment by owners, until the circumstances of the resignation have been investigated by a committee of the association.

The Great Northern Ry. (U. S.) has inaugurated a car ferry service between Port Guichon and Sidney, B. C. When the additional lines under construction are completed the Great Northern will have termini in Vancouver and Victoria as well as in Spokane, Wash. The car ferry Victorian has been placed on the service and another will be added later on.

Abolition of the canal tolls in Canada came in force at the opening of the different stretches of waterways, but the doing away with the tonnage dues and inspection fees will require the passing of an act of parliament. However, an arrangement has been made by which no dues or fees will be collected this year.

A new tug, the Lord Kitchener, built at St. John, N. B., has been fitted with pumps which can be used in case of fire on board ship or along the water front. The recent fire at Sand point wharves showed the necessity of having better floating fire apparatus than those then existing.

The Dominion government has decided to employ an independent engineer to examine and report upon the merits of the two suggested outlets of the Trent canal into Lake Ontario. One route is via Port Hope and the other is via Trenton.

The Newfoundland legislature has established a board for the examination of marine engineers. First and second engineers on examination will receive certificates of competency, and service certificates will be given to men of ten years' standing who cannot pass the examinations.

The tug Lord Stanley, purchased by the Dominion government for the hydrographic survey of Lake Superior, has been renamed the Bayfield. The old Bayfield, which made the hydrographic survey of Lake Huron, has been sold out of the service.

W. F. McLean, M. P., wants the Canadian parliament to change the name of Hudson's bay to the Canadian sea, retaining the name of Hudson's strait for the body of water connecting the bay with the Atlantic ocean.

The International Transit Co. at Sault Ste. Marie, Ont., has arranged to buy out the independent ferry hitherto operated across St. Mary's river. This will give the Consolidated Lake Superior Co. entire control of the ferry between the two "Soos."

Dominion government surveyors have refused to grant a license to the steamer Glengarry, and J. B. Canton of Montreal, who purchased her from the Montreal Transportation Co. is seeking to recover the amount paid.

The steamer Wacondah, built in Scotland for the McKays of Hamilton, is ready for lake service. She will run in the Merchants' Despatch Line between Montreal and Fort William.

J. C. Ferris of St. John, N. B., proposes having a tug built for sea-going service.

Hadsett Bros. of Quebec have had built a tug for river work, 45 ft. long, 11 ft. beam and 4 ft. 6 in. depth of hold.

Jos. Lachance, formerly superintendent of the Quebec harbor commission, died suddenly at St. Saveur, Que., a few days ago.

Holders of preferred shares of United States Steel Corporation stock must decide before next Saturday whether they will convert 40 per cent. of their holdings into new 5 per cent. bonds, or whether they will retain their 7 per cent. stock. The offer to shareholders is to subscribe to the extent of 50 per cent. of the stock holdings for the new bonds, paying 40 per cent. in stock and 10 per cent. in cash; or merely to exchange the 40 per cent. stock for bonds without subscribing cash.

PRESENTATION TO MAJ. SYMONS.

Maj. Thomas W. Symons, who was for eight years the government engineer at Buffalo, was honored by the citizens of Buffalo on Monday of this week in a most substantial manner. He was presented with a solid silver tea service of five pieces and a gold watch and chain. The presentation was made on the floor of the Buffalo Merchants' Exchange and was witnessed by as many persons as could crowd upon the floor. Mr. Charles W. Goodyear was chosen to present the gifts to Maj. Symons. In his presentation speech he said:

"When you came to Buffalo nearly eight years ago, there were very few of our people who had the pleasure of your acquaintance. You found here awaiting you a great public task, involving important engineering problems, as well as many grave business considerations. You took this work in hand willingly, scientifically and with an earnest purpose to serve your government, loyally and faithfully, with devotion to the interests of the people, and with an enlightened appreciation of the wants and requirements of the port of Buffalo, and its business and commercial interests, both present and future. It had been said by some, upon whose judgment and scientific knowledge we had a right to rely, that the task before you, and which you have since completed, was impossible of accomplishment, because of certain physical difficulties that existed under the waters of Lake Erie. Most wisely, and fortunately for us, you preferred not to accept the judgment of others, but you proceeded to make an original investigation, and to ascertain for yourself the feasibility of the construction of a great harbor for this city. Today, when you are about to leave us, we find the task which you set out to do fully accomplished, and much other work of great importance projected and planned under your far-sighted and successful administration of the office which you have so ably filled.

"The greatest breakwater in the world has been completed by you. In the construction of this work you have been the means of inaugurating a new era in the commercial life of this city. But for this breakwater the great Lackawanna steel plant would have been impossible. But for this breakwater the numerous other industries that have sprung up along the shores of Lake Erie could not have been constructed. But for this breakwater the great extent of water front available for shipping, railroad and canal transportation would not have been available, and, I may safely say, but for this breakwater the greatest railroad system in the world, the Pennsylvania, would not have had direct connection with this city for many years to come. You have also planned other improvements which will add to our commercial and transportation advantages; and which, when carried out and completed, will almost equal those that have been brought to successful completion under your efficient management. Fortunately for us, because of your great ability, your sound judgment and your attainments in your chosen profession, prior to the time when you came to Buffalo you had established a reputation with the president, with the war department, and with congress that almost insured the adoption of your official recommendation to the government.

"Besides the work in connection with our harbor, which has been carried on under your direction, you have, in behalf of the people of the Empire State, also devoted much time and earnest labor to the location and construction of the great 1,000-ton barge canal, that will so materially add to the commercial and business importance of this commonwealth. You have solved the engineering problems connected with the new canal, and it is upon the basis of the report which you made upon that subject that the people are to be called upon at the next election to determine the question of its construction. No man who contemplates the future of our state or of our city can over-estimate the great value of your services in this behalf. We all look forward with hopeful anticipation to the completion of this great work, foundations of which you have so ably laid.

"I have only briefly alluded to the work which you have accomplished in your official and professional capacity. As a citizen of Buffalo you have endeared yourself to all who have had the pleasure of your personal acquaintance. Your simple and unostentatious manner, your cordial greeting of every friend whom you have met here, your quiet and gentle life, the open door which we have always found at your office and your house, have inspired in our hearts a love and respect accorded to but few men who have dwelt among us. I think I may safely say that to no man within the last fifty years has good fortune afforded such an opportunity to extend and build up one of the leading commercial manufacturing cities of our country. You came among us a stranger with slight knowledge of our requirements. You seized the opportunity for us, and without reward, or the hope of reward, through years of toil and constant effort, you have accomplished for us, and for those who come after us, results beyond our fondest anticipation. If I may be pardoned a moment's digression, I will allude to an interesting fact in connection with your advent here, of which we are gratefully proud. It was upon the order of that sturdy figure in American public life, Grover Cleveland, then president of the United States, and a citizen of Buffalo, through his secretary of war, Col. Daniel S. Lamont, that you were assigned to the position from which you have been recently transferred.

"Now, in consideration of these great achievements, upon

your part, of your high character and of your gentle life, the citizens of Buffalo take pleasure in asking you to accept from them some testimonial that you may take with you, and that you and your family, during the years that remain to you, may use and enjoy, and that your children hereafter may regard with pride as an inheritance from their worthy father. We do not present these gifts to you because of their intrinsic value, but because there may be something in their possession which will, in some slight measure, constantly remind you of the appreciation, the kindly feeling and the affection with which the citizens of Buffalo regard you. I beg to present you with the silver tea service which you now see before you; and that we may come, perhaps, a little closer to you in the expression of our personal feelings, I also hand you this watch and chain, which I hope you will wear so long as you live, and when you look upon its face, or listen to the tones of its musical bells at night, you may ever be reminded that here, in the city of Buffalo, you have a lodgment in the hearts of our people that will ever remain, so long as those of us who are now living have memories to cherish your kindly and unaffected life among us, and the valuable results which you have accomplished for the whole of our people. Take these gifts, dear major, take them to your home; keep them, and look upon them as an expression to you of a sentiment which will always exist upon those who had the pleasure of your acquaintance, and in those who have profited by the great good that you have done to this community. May I extend to you my hand, and grasp yours in the warmest of good-fellowship, and say to you 'God-speed' in the work which you have been called upon to undertake, and peace, long life, and happiness to you and yours; and I also say to you that the people of Buffalo wish you good-bye with the most sincere feelings of love, thankfulness, kindness and respect."

The reply of Maj. Symons was quite affecting.

KINGSTON HARBOR ITEMS.

Kingston, Ont., May 13.—The wooden steamer Simla, largest vessel ever turned out by the Calvin Co., was launched recently and is now at Toronto where boilers and engines are being installed by the Polson Iron Works. The new vessel will ply between Garden Island and Toronto and upper-lake ports, carrying mostly timber but occasionally grain. She has capacity for 70,000 bu., and is 240 ft. long, 37 ft. beam and 15 ft. depth. Captain Malone of Kingston will have charge of her.

It is certainly unfortunate that the fine new steel steamer Wocanda should meet with a costly accident on her first trip up the St. Lawrence. She struck in some one of the canals or dredged river channels and sank in 17 ft. of water at Farren's point, near Prescott. She is loaded with fire brick. Capt. John Donnelly of the Donnelly Salvage & Wrecking Co. was on the ground shortly after the accident with pumps and other wrecking appliances, as well as a large force of men, and it goes without saying that the job of floating the vessel and delivering her for repairs will be well handled. The Wocanda was built in England for R. O. & A. B. Mackay of Hamilton and was on her way to her home port from the builders when the accident occurred. She is of full Canadian canal dimensions and is worth probably \$180,000.

The steamer Clinton, owned by J. & J. T. Matthews, Toronto, and sailed by Capt. Joseph Siddell, was placed under government seizure at the Kingston custom house. She came here with timber for the Calvin Co., Garden Island. Hull inspector Davis learned that she was carrying cargoes contrary to law and without the necessary certificate, so the seizure was made. Until the Clinton had her hull overhauled and other repairs made, she had no right, it is claimed, to come to Kingston. She is liable to a fine of \$200, and then must undergo the necessary repairs.

Since the first of April over 2,000,000 bu. of grain have been brought to this city from upper lake ports.

The large steamer Nicaragua, with 84,000 bu. of wheat from Duluth, suffered some slight damage by fire due to spontaneous combustion while her grain was being unloaded.

The steamer Turret Cape brought 101,000 bu. of wheat here from Fort William, the largest single cargo that ever arrived in this harbor.

UNITED STATES SHIP BUILDING BONDS.

Bonds of the United States Ship Building Co. sold on the curb in New York last week at 44. They bear 5 per cent. interest. Lewis Nixon, president of the ship building company, in explanation of the course of the bonds said:

"All the reports concerning the United States Ship Building Co. have grown out of a statement made that our wharf facilities were not up to the demand of our consumers. Of course I believe that the future of American ship building is assured, but I did not expect that the volume of work would be what it is. To meet present demands I have clearly stated that we should acquire new ship yards or greatly increase our present facilities. This has given rise to all sorts of rumors and their effect has been to cause some persons to sell while others have sold because they had to. There is no reason for the fall in the price of the bonds of the United States Ship Building Co. and they represent at current quotations a golden bargain."

The Handling and Storing of Iron Ore.*

BY CHARLES PIEZ.

The phenomenal growth of the iron and steel industry and its strong and steady progress are strikingly shown by the fact that the total production in 1870 was 3,623,585 tons; in 1880, 6,486,733 tons; in 1890, 16,264,478 tons; and in 1900, 29,508,730 tons, or an increase in three decades of 804.2 per cent. This wonderful increase in production was attended by a still more wonderful decrease in the cost to the consumers, for in 1870 the average cost of the total product was \$63.49; while in 1900, during an era of exceptional prosperity and high prices, the average cost of the total product was but \$27.24, considerably less than one-half the price of thirty years ago. This phenomenal reduction in cost has been effected very largely by the saving of labor, as is evidenced by the fact that in the production of pig iron alone the output per wage earner employed was 264.7 tons in 1890 and 367.2 tons in 1900, an increase of 38 per cent. in ten years. It is with one factor of this cost reduction that the paper this evening will concern itself.

The total iron ore production in the United States during 1901 was in round numbers 29,000,000 tons, and of this amount the Mesabi, Marquette, Menominee, Gogebic and Vermillion ranges produced 20,000,000. In other words, two-thirds of the domestic production is dependent upon lake transportation to reach the furnaces. As the lakes are closed four months out of every twelve, it becomes necessary to provide at least four months' storage at the furnaces or else at the receiving ports.

The requirements of the ore carrying trade have developed a special type of steamer of large carrying capacity, designed only for cargo. The hatches are close together and extend almost entirely across the deck. They are of such width as to readily accommodate the various unloading devices used, and their spacing and size insure that almost the entire cargo is directly tributary to them.

The vessels are loaded at Duluth, Two Harbors, Marquette, Escanaba and other shipping ports, from piers similar in many respects to those employed along the coast for shipping coal. These piers all have large storage capacity, so that the cargo is practically ready in elevated bins when the vessel reaches her berth, and can be transferred to the holds by suitable chutes within a few hours.

With a relatively short haul, despatch in loading and unloading is the essential factor in the determination of the freight rate; and the reduction of this rate from \$1.20 per ton in 1890 to 60 cents per ton in 1900 is evidence of a marked saving of time in both operations.

The problem of loading the vessels was readily solved by the use of a strengthened and enlarged coal pier; but the problem of rapid unloading was by no means so simple of solution. The most successful device for unloading coal, particularly bituminous coal, from vessels is a hoisting tower equipped with an automatic bucket. The digging ability of this bucket depends upon its weight, the shape of the blades and the penetrability of the material to be handled. As ordinarily constructed, the blades are hinged to fixed centers and when closing swing through arcs of circles. When fully open the lips are swung well back toward a horizontal line, so that the first movement of closing is an almost vertically downward one, very similar to that of a spade when used in digging. In fact, the older forms of automatic bucket are essentially digging buckets. Now, anthracite coal is sufficiently mobile and bituminous coal sufficiently penetrable to permit a digging bucket of either the clam-shell or orange-peel type of sufficient weight to readily enter and fill itself; but iron ore as a rule is so heavy, so immobile, and frequently contains so large a percentage of hard lumps that seem locked together, that the ordinary clam-shell bucket cannot be used with any degree of success on all the various grades of ore. Even the orange-peel bucket, which owing to the shape of its blades has considerably greater digging capacity than the ordinary clam-shell, is unsuccessful in the harder grades of ore.

It was largely on this account that up to a very few years ago automatic buckets were not considered feasible in the handling of ore, and the unloading from vessels was done wholly with tubs.

INSTALLING THE FIRST BROWN HOISTS.

About twenty-two years ago the first Brown hoists, as they are familiarly called, were erected by Mr. Alexander E. Brown of Cleveland, and during the next twenty years these machines were brought to a high state of efficiency. They served the combined purpose of direct transfer from vessels to cars, transfer from vessels to storage, and reloading from storage to cars. While the development of high hoisting and trolley speeds produced really remarkable results in reducing the time taken per trip, the fact that the tubs had to be filled by hand and that the loads were relatively small militated seriously against large hourly capacities. Still the time for unloading vessels was materially reduced by nesting or grouping these machines so that ore could be taken from all hatches simultaneously. Fifty tons per hatch per hour was

*Address before the Engineers' Club, Philadelphia, Pa.

exceptional, but the employment of twelve bridges on one vessel enabled vessels of even 7,000 tons to be unloaded within twelve hours. Even this remarkable record did not satisfy the demands of the times, and the inventor's genius was set at work to reduce both the time and the cost of unloading. This has now been accomplished, and it is to-day not unusual to clean up a hatch of 500 to 600 tons in four hours at a fraction of the old cost. Among the methods devised for accomplishing this result, one by Mr. Mason, of the engineering firm of Hoover & Mason, and the other by Mr. Hulett, take prominence. Mason accomplished the result by inventing an automatic bucket which fills itself in any grade of ore and by applying this bucket to a hoisting tower of the same general construction as is commonly used in the unloading of coal. The general features of the Hoover & Mason bucket are its great weight, its tremendous spread when open, and the peculiar movement of the blades when closing.

The buckets on the vessel unloaders have a capacity of five tons of ore and a spread when open of about 18 ft. The blades are flat in side view and rounded in section, resembling somewhat the blade of a gigantic shovel. The first motion of the blades on closing is downward to effect a partial penetration of the material; but during the early stages of the operation of closing, the blades swing towards the horizontal, giving a scraping action for almost the entire reach. It is this scraping action that differentiates the Hoover & Mason bucket from the clam-shell and orange-peel bucket, and it is by virtue of this action, which gathers together the loose ore on the surface of the pile, that the bucket fills itself so successfully.

In the most recently constructed lake vessels the hatches are 8 ft. wide and 12 ft. center, so that all the cargo is tributary to the hatches with practically no trimming. (This statement is not quite correct. Only three of the vessels have 12 ft. centers.—Review.) In the older class of vessels, however, the hatches are 24 ft. center, so that after the bucket has cleaned out the hatch a considerable mass of ore remains in the piles between the hatches. To bring this within reach of the hoisting bucket a scraper resembling a gigantic hoe weighing a ton or more is used. This scraper is operated by an engine located in the hoisting tower, and its movement backward and forward is controlled by a workman located inside the vessel. Often as much as a ton of ore is moved by this scraper toward the hatchway in a single stroke, and it is not unusual for the scraper to make five or even six strokes a minute. The direction of scraping is readily changed by shifting the guide and pull-back blocks through which the operating ropes pass.

HULETT AND HOOVER & MASON UNLOADING MACHINES.

Perhaps the most extensive and complete system of ore handling and storage ever installed is that constructed by the Hoover & Mason Co. for the Illinois Steel Co. at South Chicago. It comprises every operation of handling ore at a furnace plant, from the unloading of vessels to the charging of the furnace stacks.

Fifteen self-moving ore unloaders or hoisting towers, mounted on gantry legs and equipped with 5-ton automatic buckets, face the water front, and these are so arranged that they will deliver either into cars or else into an immense trough of concrete which parallels the path of the unloaders. Immediately behind this concrete trough is the storage area, which is spanned by two massive bridges 518 ft. over all. The water end of these bridges reaches across the concrete trough, while the land end overhangs the ore pockets. Each bridge is equipped with a 10-ton ore bucket, electrically operated, the entire mechanism being carried by the trolley carriage from which the bucket depends. The bridge bucket takes ore from the trough and delivers it into storage or else carries it directly to a transfer car running on top of the ore bins for distribution over the latter.

The bridges are so supported that, in addition to a parallel traverse, one end can be advanced ahead of the other as much as 300 ft. This is of decided advantage in reaching every portion of the storage area. Trolley speeds of 1,000 ft. per minute are attained, and this, too, with a trolley load, including bucket and ore, amounting very closely to 100,000 lbs. The plant at South Chicago impresses one by its boldness and its magnitude, but in addition one is struck with the ingenuity and the carefulness with which details have been worked out. Everything is massive, and the guiding principle seems to have been to get capacity by handling large masses slowly.

The Hulett machine is built on radically different lines from the Hoover & Mason unloader. A very massive gantry, traveling on rails parallel to the wharf, supports a carriage which has a traverse at right angles to the face of the dock. This carriage in turn supports a tilting girder, at the water end of which hangs a ram, carrying a clam-shell bucket. This bucket is rotatable in either direction around the axis of the ram, thus affording the opportunity to reach not only the ore that lies under the hatch opening, but also that portion which is filled up between the hatchways. The ram carrying the bucket is

always kept in a vertical position by means of a parallel motion device fixed to its head. When unloading from vessels, the carriage carrying the tilting arm moves forward, bringing the ram over the hatchway. The arm is then tilted hydraulically, the ram descends into the vessel, and the bucket is brought into contact with the pile.

The bucket is of the clam-shell type, with its blades swung from the outer corners, so as to give it a wide reach. It is operated by a hydraulic cylinder, and in closing is aided by the unbalanced load of the tilting arm, insuring thereby a full load of ore.

The buckets on the unloaders in operation at Conneaut are of 10 tons capacity, and are controlled by operators who are located on the rams immediately above the buckets, and who, therefore, descend into the vessel with them. The purpose of the massive structure and the rather complicated mechanism seems to have been to insure full bucket loads when digging, by forcing the bucket into the material, and to provide means for rotating the bucket, so that practically the entire cargo becomes tributary to the unloader without the intervention of any scraping device. The results are gained at the expense of moving many times the amount of ore handled for each round trip of the bucket. The end seems to justify the means, however, for there are number of batteries of these machines in successful operation along the lake front.

The problem of handling ore at the receiving ports, however, is only one step in the transit of the ore from the mines to the furnaces. Another problem is presented at inland furnaces, where storage on a large scale is absolutely essential to secure continuity of operation. The closed season for navigation for furnaces depending upon lake ore for the bulk of their supply makes it necessary for them to store at least 33 per cent. of their annual consumption; while the additional amount required to safeguard them against strikes, interruption to traffic, or other contingencies makes it desirable to carry a storage of at least one-half the annual consumption. Even where continuous supply can be counted on, a storage of at least one-quarter of the annual consumption ought to be provided for.

STORAGE OF ORE AT THE FURNACES.

The best location for the storage of ore is directly opposite the stock bins of the furnace, so that the machinery for handling the ore can deliver it into the bins with but one, or, if possible, no transfer.

This arrangement for more than two furnaces limits the length of the storage area for each furnace to the distance from center to center of the stacks. The average distance apart of the furnaces erected in new plants, like those of the Union Steel Co., Donora, and the Sharon Steel Co. at Sharon, is about 350 ft. The greatest desirable height of pile governed by the design of the structure of the unloading machinery is about 50 ft., which gives an area of cross-section for the length of the pile of about 17,000 sq. ft., corresponding to about 1,100 tons of storage.

Assuming the furnace to have a production of 500 tons of iron per day, corresponding to an ore consumption of about 875 tons in twenty-four hours, the storage capacity required, on a basis of one-half the annual consumption, is 16,000 tons; and this tonnage, on the basis of 1,100 tons per foot of longitudinal section, could readily be obtained with a bridge having an ore storage space 200 ft. wide.

For a plant having two or more large stacks and an ore consumption of 1,600 tons and upward per day, a complete system of handling and storing the ore, limestone and coke should comprise:

1. A line of stock bins with trestle approach; the stock bins to have capacity enough for several days' supply. The stock bin trestle should be designed to support one tower of the storage bridge.
2. A number of electrically operated weighing cars or larries arranged to receive the ore, coke and limestone from the bins and deliver them to the furnace skip.
3. A dumping trestle running parallel to the bin trestle and connected to the yard tracks by an inclined approach. This trestle will support the other tower of the bridge, the bin trestle and dumping trestle being on opposite sides of the storage area.
4. A car dumper arranged to receive the loaded cars and unload them into self-dumping transfer cars for discharging into the bins or onto the trestle pile.

5. One or more electrically operated bridge tramways spanning the storage area and equipped with automatic ore buckets; the buckets to take ore from the dumping trestle and deposit it onto the storage pile, or else to take the ore from storage and deliver it into bins or transfer car. Such a plant as above outlined involves, of course, a very large expenditure for installation, and is only warranted when very large quantities are handled daily.

For smaller plants the car dumper can be eliminated from the arrangement, and the span of the bridge tramway can be considerably reduced. There is no question, however, that even for smaller furnaces a series of stock bins, tributary to the skip hoists of the stack, through self-propelling larries, and an ore storage contiguous to the stock bins and served by a suitable bridge tramway, are essential factors in the earning capacity of the furnace.

For these smaller plants, where first cost is of paramount importance, short span bridges equipped with buckets of not more than 3 tons capacity seem to be the rational solution. The buckets are sufficiently large to fill themselves readily, and, with the light

loads, materially higher hoisting and trolley speeds can be developed, resulting in fully as large a daily output as is attained by the heavy load, slow speed plan.

A characteristic plant for a single furnace is shown in the bridge tramway erected by the Dodge Coal Storage Co. for the Penn Iron & Coal Co. at Canal Dover, O. The bridge has a clear span of 140 ft., and has a cantilever extension at each end. It is equipped with a 3-ton automatic bucket, the operation of the bucket, as well as the movement of the trolley and bridge, being effected by electric motors. The bucket is arranged either to take ore from cars directly or from the pile under the dumping trestle, and deliver either into storage or into the stock bins. At a large number of furnaces the old method of trestle storage is still adhered to, and at these plants some measure of economy in handling can be effected by using revolving locomotive cranes equipped with small capacity automatic ore buckets.

DISCUSSION UPON THE PAPER.

James Christie.—An interesting feature in connection with these large cantilevers is the way the foundations were made. Being placed near blast furnaces where there was an abundant and almost continuous flow of molten slag, this slag was utilized for the foundations. Large trenches were excavated, extending the whole length of the structure, and these were filled with molten slag to the ground line. The concrete walls that support the traveling cantilever therefore rest upon immense monoliths of slag.

The President.—This is an interesting subject. It seems a wide gap when we look back forty years to the first improvements made in handling material such as coal, ore, sand, etc., by means of the Focht self-dumping bucket, patented about the year 1861, and which Mr. Piez has shown on the screen. The principle of this device remains the same today, but there have been such wonderful developments in its application, especially in adapting it to the unloading and handling of iron ore, that it has become a large factor in harbor work.

J. Chester Wilson.—I would like to ask, Mr. President, can those booms be operated separately, so as to operate over hatches at varying distances apart?

Mr. Piez.—Absolutely separately. Buckets are very rarely used for unloading from cars directly, but if the bucket is small enough, I presume fully 75 per cent. of the coal can be removed from the car. It is rather a slow operation. The bucket has to be very tenderly handled, because the least amount of sway brings it in contact with the sides of the car, and the bottom of the car is of such shape that the bucket catches and rips it up. The problems are confined more particularly to taking coal out of the holds of vessels and away from piles. In ordinary storage work we prefer to dump the coal into bins and make those bins so large that the bucket has enough room on all sides for clearance to enable the operator to handle them, and we can get high speeds as a result from that class of handling.

The President.—Two things struck me forcibly on the occasion of a visit to Cleveland, Ohio, a few years ago, in connection with the subject of unloading and handling ore and coal. One was the prodigious amount of work that apparently was performed by the men in working with the old-time self-dumping buckets. One example was a vessel of 2,700 tons, which was unloaded in nine hours, using self-dumping buckets operated by Brown hoist cantilever machines. The rate of wages paid was 10 cents a ton, and the men, I was told, averaged \$6 per day, to earn which they were obliged to handle about 60 tons of ore, in a working day of approximately nine hours. It will readily be understood that ore is not bulky. Directly the opposite of this apparently superhuman effort was the ease and facility with which an eight-wheel ore car of 60,000 lbs. capacity could be raised and rotated and the whole contents nicely dumped into six buckets or tubs, each of which, after the car had been again rotated and set back on the track without dislocating any part of the running gear, was picked up and the contents dumped or rather placed in the hold in such a way as to give no shock to the vessel, which was loaded without trimming and the cargo left in shape for the vessel to immediately steam out of the harbor. The time of vessels in the lake trade is valuable, and they cannot spend hours in trimming cargo and cleaning up. These, then, are the two operations—one in which man must exhaust his physical strength in filling a self-dumping bucket of a ton to a ton and a half capacity, a shovelful at a time, and the other, in which the car is picked up and rotated and its load placed in the vessel by a machine operated by hydraulic power and controlled by a very few men without any apparent effort. This is certainly wonderful progress, even in this utilitarian age, and the slides which Mr. Piez has just shown us illustrate what has been done within a comparatively few years in the economical handling of coarse freight.

Mr. Piez.—I want to say a few words more. The president's statement brought to my mind the result of about eight or nine months' work. We just secured an order for the first car dumper on the coast. The Delaware, Lackawanna & Western have placed a contract for a car-dumping machine for anthracite coal. That is a very material departure from the old wooden piers used so generally at Port Richmond and Port Reading for loading anthracite coal. There has always been some feeling that anthracite coal had to be handled more tenderly—had to be

wrapped up in tissue paper, as it were, instead of handling it as they do soft coal. The question of breaking up the lumps is quite as essential and it affects the price of bituminous coal quite as much as it does that of anthracite. We are interested peculiarly and otherwise in the result of the first application of a car-dumper to the anthracite coal trade.

Jas. Herbert Stitzer, Jr.—How do those car dumpers act? Could you tell us a little more in detail how they handle the car.

Mr. Piez.—I was going to suggest that Mr. Johnston might give a little information on the subject.

A. C. Johnston.—I don't understand what is expected in answer to this question. The chief curiosity always seems to be regarding what becomes of the stresses on the car and cradle as they go over. It is rather difficult to describe without having slides. If we had those it would then be an easy matter. In the most successful dumper there are four counter-weighted chains provided, and as the car goes over these chains wrap around the car. There are other forms in which the car has to be clamped by hydraulic cylinders. In the one just described by the president that is the form used. The chief objection is that if air should get in the pipes or anything interfere with the hydraulic system, the cars would be dumped off the machine. As a matter of fact, that has occurred several times. In the ordinary car dumper the car is first lifted up to the necessary height and the coal is delivered by means of a chute from the car to the hold of the vessel. In the Brown car dumper the coal is delivered into six buckets which are in turn picked up by two overhead cranes and their contents delivered into the boat, one at a time. In a still later form of car dumper the entire contents of the car are delivered into a large pan or receiving hopper, which is then raised to a sufficient height to allow the coal to be discharged by gravity into the vessel. Mr. Piez, in his paper, mentioned also another type first built in this country at Ashtabula. That consisted of a long tipping cantilever—something similar to the one described. The cars were brought up on an inclined girder, which was then tipped over, allowing the contents of the car to be shot out through the end. This required a special form of car, and as a matter of fact the Lake Shore railway built something like sixteen hundred or two thousand cars especially for this machine. All the latest car dumpers will take any car in the whole train. To give an idea how easily the cars are handled, I may say that I have frequently seen practically a flat car with a 12-in. plank around the edge, making the height of the sides so low that the clamps would not descend sufficiently low to grip them. In order to handle such a car, lumps of coal are placed on the top of the 12-in. plank and the clamps brought down on top of these. In every case the lump of coal remained uncrushed. On the other hand, the hydraulic clamps are so powerful that when they get on the top of the car and pull it down on to the machine, the truck, in going over, will not slip on the rails. The friction between the rails and the truck is sufficient to hold it, even when its entire weight is thrust on the side. I think that is about all I can say in answer to that question, unless there is more information desired. There is nothing put on the car. In one form of car dumper the chain is wound around. The first action is to slide the car over sideways. There is no strain on the trucks whatever. In other machines, which have hydraulic clamps, these hold the car securely in every direction so that no sliding action of the car sideways is required. They are all steam hoist, and wire ropes are used for lifting the load.

VISION OF A RUDDERLESS, SCREWLESS SHIP.

With attendants on board who are so carefully trained that the chance of a doubled-up rose leaf disturbing the sleep of any passenger is scarcely conceivable, the most pronounced of sybarites even display a slight hesitancy about calling the lot of cabin passengers on a modern steamer hard; and while beautiful surroundings, splendid accommodations and tastefully served food contribute their quota towards making an ocean voyage enjoyable, it is the sense of security among the passengers, and their belief in the impossibility that anything could happen to such a boat that makes the western-ocean trips so popular. Even should such a steamer, coming into collision with an iceberg, have her prow stove in, the bulkheads would keep her up. In case of damage to her bottom a second hull is ready to keep her floating. An automatic device warns the officer on the bridge in case of fire, and the closing of one or all the watertight compartments can be done from the bridge.

It has been said that anyone who is anxious to beat a dog can readily find a stick, and by prohibiting any single-screw steamer from being regarded as a subsidy mail boat it is expected to increase the safety of the traveling public. One writer even goes so far as to say that "public sentiment should now be so well educated upon the necessity of a sea-going steamer possessing twin-screw engines as upon the necessity of a modern railroad having a double track." Without expecting that boats with single propellers shall soon become obsolete, it must be admitted that vessels provided with two engines that throb as one have many advantages.

The improvement made in all kinds and conditions of screws appears to have reached the limit, and lately inventors have not given so much thought to propellers as to another means of turning them. The first so-called turbine has safely crossed the Atlantic, and though she failed to make the passage in record-

breaking time on account of head seas and boisterous weather, the engineers declare themselves satisfied with the work done by this latest in engines, and which they further explained to be an arrangement by which the propeller is turned by the direct application of steam to the shaft, obtaining several advantages—first, simplification of machinery and moving parts; second, greater safety in the action; third, a more rapid and regular movement. Referring to the rapidity of motion, it is claimed that these engines can revolve a screw so fast that a cavity is produced and it turns in a void, so that care must be taken against making more than a certain number of revolutions per minute in order to have satisfactory results as regards speed of the vessel. Compared with the cost of a common marine steam engine that of the turbine is slight, but the coal consumption is said to be—well, considerable.

But, why say any more about propellers, turbine engines, or even such useless appendages as rudders are soon expected to become, for a French engineer has come forward with the idea of a really radical nature of doing away with the screw and even abolishing the rudder. He claims to have constructed a fantastic little boat, which it pleased him to call the *Fantaisie*, in the structure of which one can not see any machinery or exterior arrangement, and whose speed he claims to be incomparably superior to anything afloat. To use his own words "*mesamis, c'est un fait accompli.*"

To all kinds of ships, not excepting the submarine boats, to which it gives the speed that has been lacking until now, this new system may be applied, and it is especially to the latter that the screwless and rudderless system will be of the greatest advantage. Said system as found on the *Fantaisie* is now offered to the government of the United States, and inspection by naval officials of Washington has been invited by the optimistic inventor. Detailed information is not given as to the construction and the working of the boat, and at present we shall have to be satisfied with the Frenchman's assurance that the days of the propeller are numbered, that the advantage of the present manner of steering is doubtful, and that the ships of the future shall appear as if flying like swallows, grazing the waves; "*comme les hirondelles*," to quote the inventor. In appearance the *Fantaisie* is somewhat like Jules Verne's *Nautilus*, but, while the latter might be entered from the deck, and even inspected through an abnormally large show window that was inserted for the accommodation of any reader of "Twenty Thousand Leagues Under the Sea," the interior arrangement of the former must for the present remain a secret to the public.

F. H.

PRODUCTION OF WIRE RODS IN 1902.

According to the Bulletin of the American Iron & Steel Association, the production of iron and steel wire rods in the United States in 1902 amounted to 1,574,393 gross tons, against 1,365,934 tons in 1901, 846,291 tons in 1900, 1,036,398 tons in 1899 and 1,071,683 tons in 1898, showing an increase of 208,459 tons, or over 15 per cent. in 1902 as compared with 1901. Of the total production in 1902, 1,574,187 tons were steel and 206 tons were iron rods. The following table gives the production by states in the last three years in gross tons:

States—Gross tons.	1900.	1901.	1902.
Massachusetts, Connecticut, Rhode Is-			
land, New York and New Jersey.....	134,502	176,101	201,653
Pennsylvania	240,533	386,037	509,802
West Virginia, Kentucky, Alabama and			
Ohio	244,731	422,679	440,558
Indiana and Illinois	226,525	381,117	422,380
Total	846,291	1,365,934	1,574,393

Pennsylvania made the largest quantity of wire rods in 1902, with Illinois second, Ohio third and Massachusetts fourth. Eight other states, Rhode Island, Connecticut, New York, New Jersey, West Virginia, Kentucky, Alabama and Indiana, also rolled wire rods in 1902. With the exception of West Virginia, which first rolled rods in 1902, all of the states named also produced rods in 1901.

The production of wire nails in the United States in 1902 amounted to 10,982,246 kegs of 100 lbs. as compared with 9,803,822 kegs in 1901, an increase of 1,178,424 kegs, or over 12 per cent. In 1900 the production amounted to 7,233,979 kegs, in 1899 to 7,618,130 kegs, in 1898 to 7,418,475 kegs, in 1897 to 8,997,245 kegs, in 1896 to 4,719,860 kegs, and in 1895 to 5,841,403 kegs. The wire nails produced in 1902 were made by sixty-two works, as compared with sixty-one in 1901. The production in 1902 was greatly in excess of that of any preceding year. Almost all the wire nails produced in 1902 were made of steel. The following table gives the production of wire nails in 1901 and 1902, in kegs of 100 lbs.:

States—Kegs of 100 lbs.	1901.	1902.
New Hampshire, Massachusetts, Rhode Is-		
land and Connecticut	71,553	309,651
New York	136,118	132,854
Pennsylvania	3,118,508	4,219,604
Maryland, West Virginia, Kentucky, Ala-		
bama and Ohio	3,633,894	3,251,918
Indiana and Illinois	2,716,748	2,902,006
Michigan, Wisconsin and California	127,001	166,213
Total	9,803,822	10,982,246

MR. CARNEGIE'S ADDRESS.

He Outlines what He Believes to be the Secret of His Great Success as an Iron Master.

Mr. Andrew Carnegie has just been elected president of the British Iron and Steel Institute, the first person not a citizen of the United Kingdom to be elected to that honor. Anything which Mr. Carnegie says is, of course, interesting, and his address before the institute was especially so. In it he practically reviewed his business career, which is, without question, the most extraordinary in American history. Carnegie's career is singularly helpful to everyone, for no one could have started more humbly in life than he. He began at twelve years of age to tend a boiler in a basement and for a full year lived in that hole; then he became a messenger boy, which, while immeasurably superior to his first employment, was still a very lowly office. Mr. Carnegie is the first man whose association with steel making has been commercial, rather than mechanical, to become the president of the British Iron and Steel Institute. His address was very long but the pith and marrow of it was as follows:

"Looking over the list of your presidents, their successor is struck by the value of the services they have rendered. Great names are there, among them the chief inventors and pioneers in iron and steel—Bessemer, Siemens, Bell and others, whose names are household words. There is scarcely one who has filled the office who has not been able in his inaugural address to deal with a branch of the subject, as perhaps the recognized first living authority upon it. What a contrast the present occupant presents, who has no show of a claim to rank either as inventor, chemist, investigator, or mechanic. None know so well as you, fellow members, that his attention has been centered on the business department, and that it is experience in this alone which entitles him to address you. It is the department which differs most, perhaps, from any other—at least an American humorist gives it as his opinion that the business instinct can no more be instilled in men by teachers than the homing instinct could be developed by feeding them upon pigeon pie. I invite your attention this morning, therefore, to the important question of the organization and management of that most complicated of all pieces of machinery—man—which has been my province.

"Speaking from experience, we had not gone very far in manufacturing before discovering that perfect management in every department was needed, and that this depended upon the men in charge. Thus began the practice of interesting the young geniuses around us, as they proved their ability to achieve unusual results, the source of big dividends. These received small percentages in the firm, which were credited to them at the actual cash invested, no charge being made for goodwill. Upon this they were charged interest, and the surplus earned each year beyond this was credited to their account. By the terms of the agreement three-quarters of their colleagues had a right to cancel it, paying the party the sum then to his credit. This provision was meant to meet possible extreme cases of incompatibility of temper, or if the recipient should prove incapable of development or of enduring prosperity. At death the interest reverted to the firm at its book value. The young men were not admitted to assume any financial obligation, and not until their share was fully paid by the profits, and there was no further liability upon it, was it transferred to them. Thus, thoughts of possible loss never prevented concentration upon their daily duties. They were not absorbed in the daily quotations, for the shares were not upon the stock exchange or transferable. This policy resulted in making some forty odd young partners, a number which was increased at the beginning of each year. By this plan they were rapidly paying for their interests and promising to become the millionaires of the then seemingly somewhat distant future, which, however, proved not so very distant. They are now rich men. You will not fail, however, to note that the plan kept them all in excellent training, as poor men still living upon their salaries, millionaires in posse, indeed, but not in esse—quite a difference, for millionaires seem liable to develop, when still very young, so many hitherto unsuspected weak spots in their constitutions requiring careful nursing and many absences and short hours, and a dozen other impediments to hard, continuous exertion, that it does not seem good for their robust health that they should be unduly burdened before reaching middle age. The zest of the chase is over too soon. It will be found the exception when a millionaire employe strains himself unduly by overexertion to some leisure for self-improvement. When a man has achieved a competence new duties to his family and to himself arise. Money is properly only the means to an end.

"We did not fail to see, as the works enlarged, how much success depended upon the mechanical men, the superintendents and foremen. Yet not one of these had up to that time been admitted as a partner. The business and the mechanical men—office and mill—were still widely separated. Well do I remember the first attempt to bring these two departments into closer relations. It was made with our Capt. Jones, one of your members, well known and appreciated by many of you as in the foremost rank of managers, perhaps the foremost of his day in America. He came to us as a working mechanic at 8 shillings a day. I explained to the captain how several of the younger men in the business department had been made partners and were actually receiving much greater rewards than he, while his services were at least equally valuable, and informed him that we wished to make him a partner. I shall never forget his reply.

"'Mr. Carnegie, I am much obliged, but I know nothing about business, and never wish to be troubled with it—I have plenty to trouble me here in these works. Leave me as I am, and just give me a thundering salary.'

"'Hereafter,' I said, 'the salary of the president of the United States is yours, captain.' And so it remained until the sad day of his death.

"The captain's declination of partnership was the only one which ever came within my experience. None of the other mechanics ever preferred salary to partnership, and they were wise. From that time forward the union of the mechanical and business partners went steadily forward until no manager of a mill was without his interest in the business, as pertaining to the position, and no board of management or important committee was without a mechanical representative. Thereafter mill and office conferred upon all important sales or contracts. The mechanics and the men of affairs were in constant consultation and fellow partners—one of the most profitable changes that we ever made. There was another step taken in the same direction. Men having others under their charge were given an interest in the proceeds of savings in cost of their department. Where it was possible to decide the limits of a department the managers were rewarded by handsome bonuses beyond their salary, based upon the general profits of the year. Thus, as a rule, every man in authority became more than a mere wage earner. He felt himself on the first step of the ladder which led to partnership sooner or later, and was worth any two mere employes paid only a daily or monthly wage and denied special recognition.

"The great secret of success in business of all kinds, and especially in manufacturing, where a small saving in each process means fortune, is a liberal division of profits among the men who help to make them, and the wider distribution the better. There lie latent unsuspected powers in willing men around us, which only need appreciation and development to produce surprising results. Money rewards alone, will not, however, insure these, for to the most sensitive and ambitious natures there must be the note of sympathy, appreciation, friendship. Genius is sensitive in all its forms, and it is unusual, not ordinary ability, that tells, even in practical affairs. You must capture and keep the heart of the original and supremely able man before his brain can do its best. Indeed, this law has no limits. Even the mere laborer becomes more efficient as regard for his employer grows. Hand service or head service, it is heart service that counts. In the progress toward more harmonious conditions between employer and employed we see that the system of payment by fixed wages has been largely supplanted by payment according to value of service rendered by workmen in positions of authority over others, and by recognition, not only in money, but in position, which often counts quite as much as coin, and not seldom much more with the ablest. There remains still receiving the fixed wage the great mass of ordinary workmen, but we see in the history of relations of employer and employed that these have not failed to rise greatly also. The movement tending to improve the position of the worker has not passed over even the humblest, but has reached and benefitted all.

"But the irresistible pressure which has forced change after change in the relations of capital and labor still operates unchecked. We have evidence of this in another important advance, the sliding scale, which provides not a fixed wage, but in some degrees settles by results. Increased demand brings higher prices and profits to the employer, which, in turn, bring to the workmen higher returns. So that as the employer's profits rise and fall, so do the workman's rewards. If I were asked what were the best service the Carnegie company was ever able to render the wage earner, next to giving steady employment at wages equal to any, I should answer: 'Persuading them to adopt the sliding scale, with a minimum insuring living wages, at its works at Braddock, fourteen years ago, which has given perfect satisfaction from that day to this and is still in force, and has produced undisturbed harmony between capital and labor.'

"It is an instructive fact that the majority of the principal steel companies in the United States have, at some period in their career, either been in the hands of receivers, been mortgaged, reorganized or sold by the sheriff, to the great loss of their original owners. Indeed, those who have escaped financial trouble are the exception. There was no overcapitalization in any of these companies. Only actual cash counted. Our experience in America has not been peculiar. The year before last the iron and steel works of Germany were generally in depressed conditions and their shares suffered heavily. I read a list of these losses at the time which impressed me deeply. If I remember rightly, many declined one-half or more. Several important works were reported in financial trouble. Your own experience in Britain is similar. You know too well, gentlemen, how the path of iron and steel is strewn with financial loss in all countries, and that all forms of business must encounter great risks. Scarcely a week passes without news of embarrassment or failure in the industrial world. Thus it has ever been, and ever must be, while human nature remains unchanged.

"Bearing all this in mind the thought of asking the workingman to risk his precious savings in the manufacturing or any form of business was always discarded by us as too dangerous for him. He was advised to buy a home instead, and save his rent. To facilitate this money to build homes was lent to the employes, who had the ground clear of debt. Their savings up to \$2,000

each were taken by the company and placed in a special trust fund, entirely separate from the business. Interest at 6 per cent. was allowed to encourage the workman to save part of his earnings for old age. The funds received were lent upon mortgage on real property, generally to such workmen as wished to build homes. It was believed that this was the safest, and therefore the wisest, use of their savings which workmen could take.

"The most convincing proof of the steady march of labor to recompense more and more, based upon profits, and in forms drawing capital and labor into the peaceful bonds of mutuality, is to be credited to the United States Steel Corporation, the largest of all industrial corporations, and for which it deserves unstinted praise, as proving a genuine interest in the workmen and sagacious thought for its own. To this step toward profit sharing I invite your earnest attention, for it may well prove of surpassing importance and mark an epoch in the history of the relations of capital and labor. It may even be looked back to as having furnished the solid foundation for the solution of most of the troublesome questions between them.

"There is another point of view, the influence upon the prudent workman of distracting anxiety in regard to the absolute safety of what may be his sole provision for old age. He will see every morning the stock exchange quotations, for the American workman reads the papers. Only recently he would have seen the preferred stock of the United States Steel Corporation temporarily quoted lower than the price charged for it to him. This may mean little to the man of affairs familiar with the ups and downs of the mercurial stock exchange, but what must be the effect upon the uninformed workman? Of this I am well assured, the workman whose thoughts are upon the speculative surprises of the exchange will not prove desirable. Speculation is the parasite of business feeding upon values, creating none, and is wholly incompatible with the satisfactory performance of other regular work requiring constant care and caution. The workman's investment should never be at risk, for if his thoughts are upon the stock exchange they cannot be upon the machinery, and machinery, like art, is a jealous mistress, brooking no rival claimant to its absorbing demands.

"In the interests of the employer therefore, as well as that of the workman, the savings of the latter should be secure here, as in other respects their interest is mutual, and hence I believe the needed change will be made by the Steel Corporation in the near future. I cannot speak too highly of this experience, nor give the Steel Corporation too much credit for making it, since it is declared to be in the experimental stage, and subject to future improvement, as all new schemes should be. Its able and progressive author, Mr. Perkins, is to be heartily congratulated.

"Perhaps I may be considered much too sanguine in this forecast, which, no doubt, will take time to realize, but as the

result of my experience I am convinced that the huge combination, and even the moderate corporation, has no chance in competition with the partnership which embraces the principal officials and has adopted the system of payment by bonus or reward throughout its works."

HEAVY IMPORTS OF IRON AND STEEL.

Importation of iron and steel shows no sign of abatement. The treasury bureau of statistics reports March imports at over \$4,000,000 against about \$2,000,000 in March of last year; and for the nine months ending with March at over \$38,000,000, against less than \$19,000,000 in the corresponding months of last year. Curiously, all of the more important articles or classes of articles so imported are those of which the United States is a large producer. The United States is now by far the greatest pig iron producer of the world, having last year produced more of this article than the United Kingdom and Germany combined, her production having practically doubled since 1897. Yet the importations of iron and steel during the fiscal year which is to end with next month will be double, in value, those of 1897, and four times those of 1899. The three classes of articles which show the largest increase are pig iron and steel rails, and ingots, blooms and billets of steel. Pig iron shows an increase from 76,728 tons in nine months of last year to 725,270 tons in the same months of this year or nearly ten times as much this year as last, despite the fact that production is still increasing. In ingots, blooms, bars, etc., the increase is still more rapid, the total importation of the nine months of last year being 41,370,209 lbs. and in the nine months of this year 657,597,319 lbs. In steel rails, of which the United States has in the past not only supplied her own wants, but exported largely, the percentage of increase is still larger, the imports of the nine months of last year having been but 3,262 tons, while those of this year for the same months were 92,889 tons, or nearly thirty times as much. The value of the pig iron imported in the first nine months of this fiscal year is \$12,645,060, against \$1,925,858 in the same months of last year; that of ingots, billets, etc., \$7,551,374, against \$1,424,430 last year; and of steel rails, \$2,181,187, against \$85,172 last year.

The Nicholson ship log, manufactured by the Nicholson Ship Log Co. of Cleveland, O., is at present being installed on the torpedo boat destroyer Decatur. The Prairie is about to leave on a cruise, during which the log will be thoroughly tested by the navy department. The department's experience with the log so far has been satisfactory. It is also being installed on the Hudson river steamer New York and on Arthur Amory's yacht at Boston.

BELLEVILLE WATER-TUBE BOILERS

NOW IN USE (FEBRUARY, 1903)

On Board Sea-going Vessels, NOT INCLUDING New Installations Building or Erecting.

French Navy	-	-	-	-	-	-	-	-	276,460 H. P.
English Royal Navy	-	-	-	-	-	-	-	-	849,300 "
Russian Imperial Navy	-	-	-	-	-	-	-	-	193,900 "
Japanese Imperial Navy	-	-	-	-	-	-	-	-	122,700 "
Austrian Imperial Navy	-	-	-	-	-	-	-	-	32,900 "
Italian Royal Navy	-	-	-	-	-	-	-	-	13,500 "
Chilian Navy	-	-	-	-	-	-	-	-	26,500 "
Argentine Navy	-	-	-	-	-	-	-	-	13,000 "
The "Messageries Maritimes" Company	-	-	-	-	-	-	-	-	87,600 "
Chemins de fer de l'Ouest: (The French Western Railway Co.)	-	-	-	-	-	-	-	-	Steamships
plying between Dieppe and Newhaven	-	-	-	-	-	-	-	-	18,500 "
Total Horse Power of Boilers <u>in Use</u>	-	-	-	-	-	-	-	-	1,634,360

WORKS: Ateliers et Chantiers de l'Ermitage, at Saint-Denis (Seine), France.

TELEGRAPHIC ADDRESS: Belleville, Saint-Denis-Sur-Seine.

DYNAMITE SENT TO CUNARD PIER.

At present the New York police are endeavoring to unravel the mystery surrounding the delivery of a box containing 100 pounds of dynamite, which was delivered last week on the Cunard pier. The box, a plain pine affair with iron handles, was left on the pier by two Italians who explained that it was to go aboard the Umbria. The box was not marked, which fact alone would have prevented its being placed aboard the vessel. It remained on the dock for twenty-two hours unclaimed and no one seemed suspicious of it except a workman who mentioned the circumstances to one of the officers. At noon of Saturday, Police Commissioner Greene received a letter, signed by an Italian name, setting forth what the box contained and adding that it was merely sent to show how easily British ships could be blown up. The statement was also made that the mafia had declared war against British commerce and intended to wipe it out as far as American ports were concerned. Police were instantly dispatched to the dock and the box was found as described. Ropes were tied about it and the box was thrown into the river. The Umbria departed on time. An examination of the box later revealed the fact that it contained 200 half-pound sticks of dynamite, fuse and time machine. Discovery was also made that the fuse had burned within a second or two of discharge. It was also stated that its prompt immersion was the only thing that prevented an appalling disaster. Everyone was tremendously excited but closer investigation rather supports the theory that a plot was not intended but that it was someone's idea of a practical joke. In the first place the mafia has no grudge against Britain; in the second place the letter to Commissioner Greene could not have been written by an Italian of the mafia stripe—it had altogether too excellent command of English and even some slight acquaintance with Shakespeare; in the third place the dynamite was of a very superior quality and explodes only by detonation, while the detonating caps were missing. It was therefore, in the opinion of experts, as harmless as a sucking dove. The fact, however, remains that dynamite was sent to the pier which, in itself, is an offense and punishable by twenty years' imprisonment. If it was a practical joke it was of that

variety which the ordinary mortal fails to grasp, especially so if his wife, or his daughter, or his *dulcinea del tobosa* were taking passage by that boat. Detectives are visiting the factories of the makers of dynamite and time machines in an endeavor to trace the shipment and it will undoubtedly go hard with those that perpetrated the joke should they be discovered.

REPORT ON BATTLESHIP MAINE'S BOILERS.

Washington, May 12.—No conclusions will, for the present, be given out by the navy department concerning the report of the board of experts upon the injuries to the boilers of the battleship Maine. Assistant Secretary Darling's reasons are that the department has not yet reached a definite decision and that the matter will probably be turned over to the bureau of construction and repair for further inquiry. It can be set down, however, that the findings of the board are not favorable to the Niclausse boiler and that the board does not support the view of the Cramps that the boiler failed from lack of sufficient water and proper care. However, the department has reached no decision upon the subject and, until it does, there is really nothing of technical interest to be said about it.

Mr. A. E. Roberts, mechanical engineer and draughtsman, has opened an office at 619 Hayward building, San Francisco, and will engage in supervising work, in consulting capacities and as expert in engineering; also in the preparation of estimates, specifications, plans and detailed drawings. Mr. Roberts was connected with the Union and Risdon iron works for several years. He gave up the position of chief of the technical department at the Risdon to form the General Engineering Co., but as he says himself, he feels more at home in consulting work.

Plans to strengthen the big guns of the navy near the end of the muzzle are now under way by the ordnance department of the navy. The recent explosion of the 12-in. gun of the battleship Iowa is considered a very serious matter, owing to its demoralizing effect upon the crew.

Photographers

Attention!

THE MARINE REVIEW is desirous of obtaining at all times interesting photographs of a maritime character. Should an accident occur, should a ship be stranded, should an unusual repair job show up in a ship yard, the MARINE REVIEW will pay substantial sums of money for any such photographs. Many a man in a dry dock, in a ship yard or aboard ship has a camera. Possibly the master or the superintendent has one. If he can accompany the photograph with a written description (merely facts; we'll furnish sentences, spelling and punctuation), so much the better and so much the more profit for him. The REVIEW pays well for good news articles.

Undoubtedly hundreds of extraordinary repair jobs are going on which would interest naval architects and marine engineers, but which are never published because they are known only to those who are working upon them.

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FIVE-MASTED SCHOONER—MAINE SHIP BUILDING.

The Dorothy Palmer, a large five-masted wooden schooner, is nearing completion at the yard of George L. Welt at Waldoboro, Me., and will be launched next week. This vessel is so finely modeled that she looks like an immense yacht and her lines are the delight of all the old ship carpenters and draughtsmen who have seen her. She is 273 ft. keel, 46 ft. 6 in. beam and 26 ft. 6 in. depth of hold, registering about 3,000 gross tons. She has a very heavy oak frame, hard pine planking and the strongest fastening ever put into a vessel of her size. Her five lower masts are of Oregon pine, each 118 ft. long, with topmasts of spruce 60 ft. long. The foremast is 32 in. in diameter, mizzen 30, and main, spanker and jigger-masts, each 29 in. She will spread 12,000 yards of sail, has a 25-H. P. Hyde reversible engine, two Baldt stockless anchors, weighing 9,000 lbs. each and carrying 220 fathoms of bowlink chain, steam steering gear, steam pumps, steam heat, electric lights and all other modern equipments, including a handsome bathroom in the after-house, and a piano. Immediately following the launch of this schooner work will be begun upon another of the same size and model, to be known as the Singleton Palmer, and after that will be built still another of the same size, not yet named and to be temporarily known as No. 10. All of these vessels are to be added to the Palmer fleet, of which William F. Palmer of Boston is the managing owner.

At Vinalhaven, which island is simply a big lump of granite in the middle of Penobscot bay, there is soon to be launched a three masted schooner, and the event will be a novelty to most of the people there, for it is many years since a launching took place on the island. The vessel, which has been named Margaret M. Ford, is 142 ft. keel, 34 ft. beam and 10 ft. depth of hold, registering about 400 tons. She has three 12-ft. hatches, being designed expressly for the stone trade, and is to be equipped with steam power for handling cargo. She is chiefly owned by Joseph Ford of Boston, and will be commanded by Capt. James Webster of Vinalhaven. Capt. A. M. Webster, the builder, will begin late in the summer to construct another vessel of about the same size and model, also for the stone trade. The Webster

ship yard is located in the woods on Pleasant river, directly on the edge of a stone quarry.

E. & I. K. Stetson of Bangor, Me., have just launched for the navy department four coal barges, known as Nos. 49, 50, 51 and 52, to be used in connection with the new naval coaling station at East Lamoine on Frenchman's Bay. The firm a few days ago laid the keel of a four-masted schooner of about 1,000 tons, to be owned by Bangor and Boston parties, and to be commanded by Capt. Charles Trask of Brewer, now master of the schooner Isaiah K. Stetson. The new vessel will be named for Horace A. Stone, a Bangor capitalist and shipowner.

The Kelley & Spear Co. of Bath have closed a contract with Boston parties to build a barge of about 2,300 tons carrying capacity, to be launched in six months and to be added to the fleet of the Baltimore & Boston Barge Co. The builders also have on the stocks two other barges, a schooner and a steam scow.

The New England Ship Building Co. of Bath is building for the Baltimore & Boston Barge Co. a barge to be launched this month. F. S. Bowker of Philippsburg has a three-masted schooner in frame. Nearly all of the Bath yards are busy this spring, and a number of contracts are being considered. At Thomaston, Belfast, Rockland, Machias, Milbridge and other places vessels are being built, and the prospect generally is good.

The Marine Construction & Dry Dock Co., Mariner's Harbor, Staten Island, New York, has lately launched the schooner gasoline yacht Queen Bess, built for Mr. R. M. Stearns, proprietor of the Hotel Nevarre, New York. Her dimensions are: Length, 62 ft. 5 in. over all; 50 ft. on water line; beam, 11 ft. 6 in.; draught, 3 ft. 6 in. Auxiliary power will be contained in a 20-H. P. Standard gasoline engine, built by the United States Long Distance Automobile Co. of Jersey City. The gasoline tanks will be made secure by the Marine Construction & Dry Dock Co.'s improved method, which has been explained in previous issues of the Review and which has been the means of bringing the company a great deal of this class of boat building, as it insures perfect security from leakage and explosion. The interior finish of the boat is in mahogany. The pilot house is provided with two folding berths, so arranged as to be utilized as dining tables. Immediately aft of pilot house is the owner's toilet, while a handsomely paneled passage way leads to main saloon aft, which contains two transom berths and is supplied with every convenience for luxurious comfort. The engine room, which is amidship, is fitted with two pipe berths and other appurtenances for the accommodation of the crew, while the galley is located between this room and the main saloon. Accommodations are such as to enable extensive cruises to be made. The estimated speed by auxiliary power is 10½ miles per hour. The boat goes into commission at once.

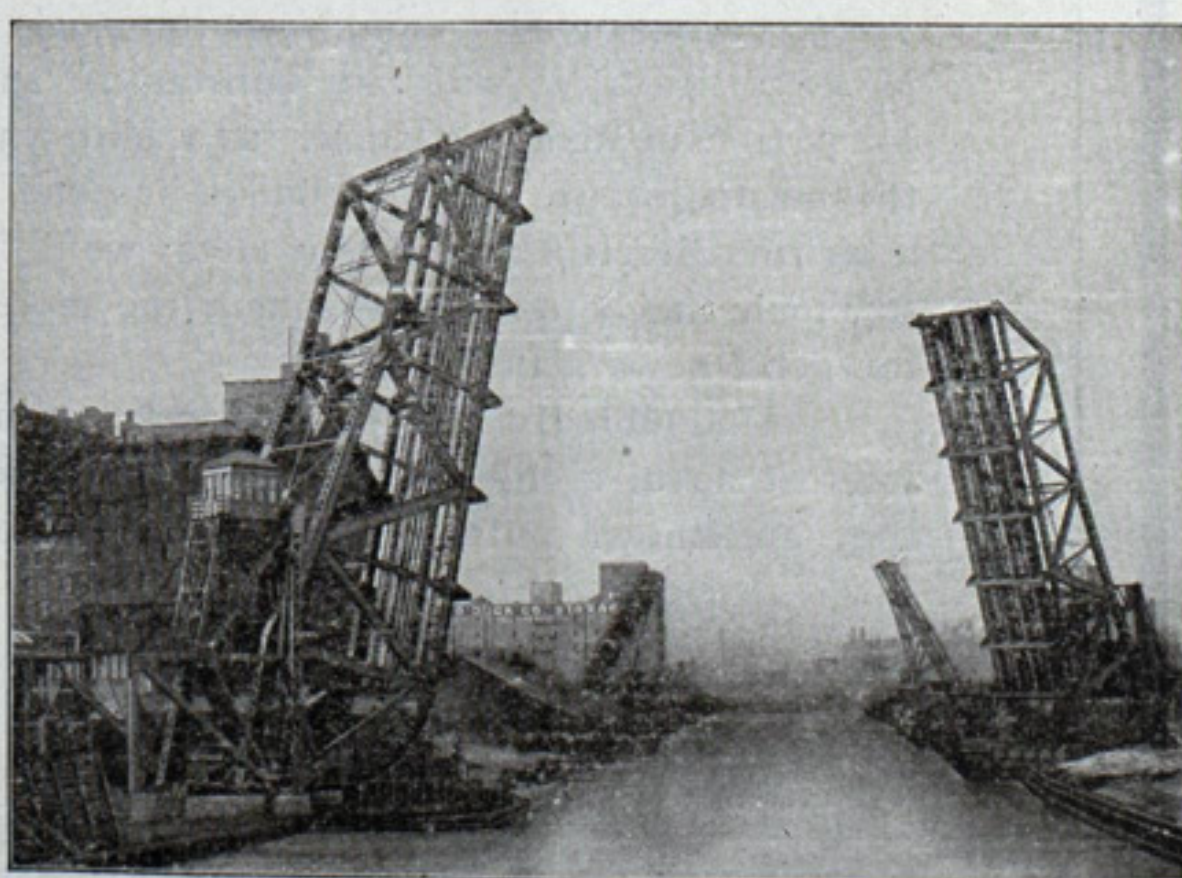
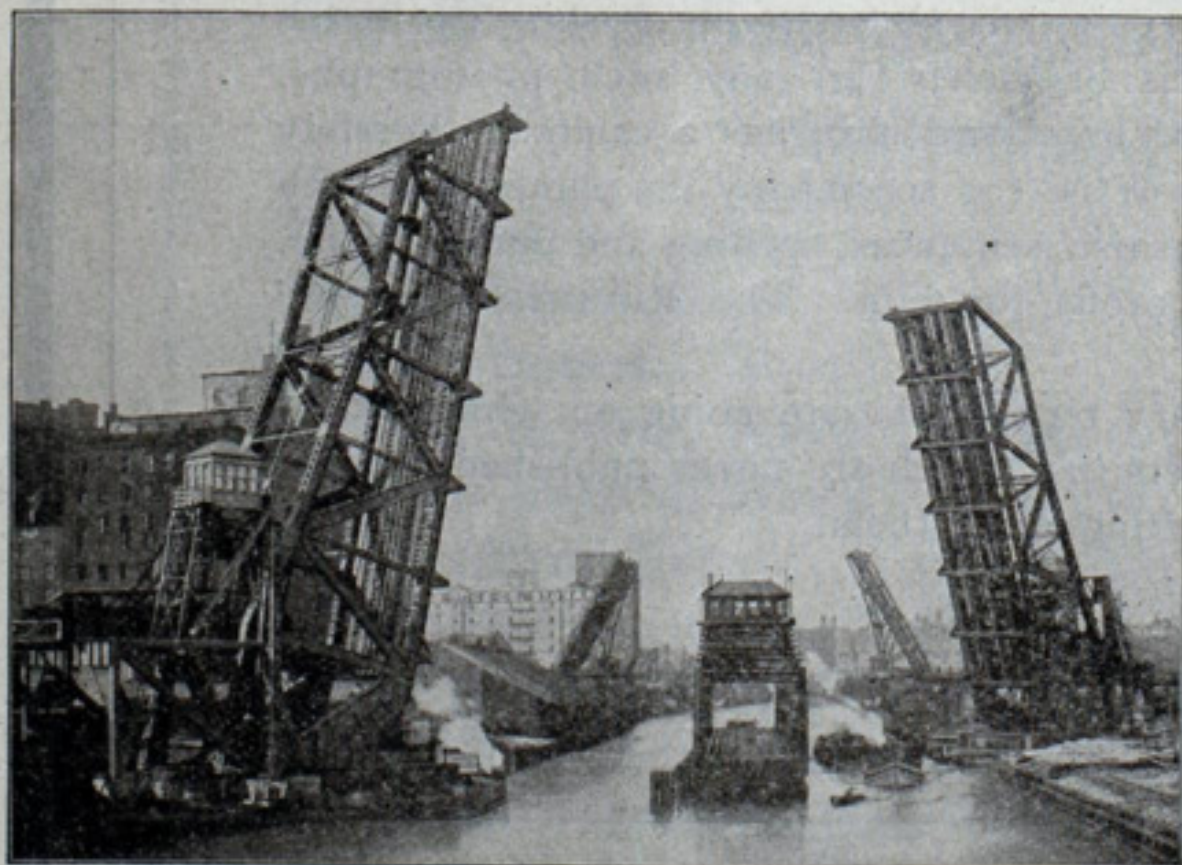
The Lunkenheimer Co., Cincinnati, reports that on account of the unprecedented demand for the line of brass and iron steam specialties which they manufacture, they have been compelled to increase their foundry output 50 per cent. Machine tools of the most improved type are being installed in various departments as fast as they can be obtained.

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TWO VIEWS OF

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